

**EPA Superfund
Record of Decision:**

**SHARON STEEL CORP. (MIDVALE TAILINGS)
EPA ID: UTD980951388
OU 02
MIDVALE, UT
09/24/1990**

JORDAN RIVER FLOODPLAIN, TERRACES FROM THE GREAT SALT LAKE/LAKE BONNEVILLE SYSTEM, AND ARTIFACTS FROM THE MINING INDUSTRY. THE TAILINGS (OU1) FROM THE MILL ARE LOCATED ON THE JORDAN RIVER FLOODPLAIN, AND THE MILL SITE (OU1) AND NEARBY RESIDENTIAL AREA (OU2) ARE ON THE TERRACES. THE TERRACE SOILS, HAVING ORIGINATED FROM THE WEATHERING OF SEDIMENTARY AND IGNEOUS ROCKS FROM THE WASATCH MOUNTAINS, ARE GENERALLY WELL DRAINED.

OU2 ENCOMPASSES PART OF THE CITY OF MIDVALE, UTAH AND SURROUNDING AREAS. APPROXIMATELY 44,000 PEOPLE LIVE WITHIN A TWO MILE RADIUS OF THE MILL SITE, 12,000 WITHIN THE CITY OF MIDVALE, 8,000 PEOPLE LIVE WITHIN ONE MILE, AND 1,400 PEOPLE LIVE WITHIN A QUARTER MILE OF THE MILL SITE. THE AGE DISTRIBUTION IS: 36 - 39 PERCENT FROM 0 - 16 YEARS; 48 - 49 PERCENT FROM 17 - 54 YEARS; AND 11 - 16 PERCENT OVER 54 YEARS.

THE LAND SOUTH AND WEST OF MIDVALE IS USED PRIMARILY FOR AGRICULTURAL AND COMMERCIAL ACTIVITIES; THE LAND NORTH AND EAST OF MIDVALE IS MOSTLY URBAN. THE ENTIRE AREA IS DRAINED BY THE JORDAN RIVER WHICH PROVIDES COLD WATER AND WARM WATER HABITAT FOR FISH, BUT IS MORE HEAVILY USED FOR AGRICULTURAL IRRIGATION. ADJACENT TO THE JORDAN RIVER ARE WETLANDS, AND POTENTIAL WILDLIFE HABITAT, BUT THESE FEATURES ARE NOT WITHIN OU2. THE SALT LAKE VALLEY HAS SUBSTANTIAL GROUND WATER RESOURCES CONSISTING OF SHALLOW AND DEEP AQUIFERS USED FOR VARIOUS DOMESTIC, AGRICULTURAL AND INDUSTRIAL APPLICATIONS. THERE ARE A NUMBER OF PUBLIC DRINKING WATER SUPPLY WELLS WITHIN A THREE MILE RADIUS OF THE SITE, MOST OF WHICH USE THE DEEP AQUIFER. THESE SERVE APPROXIMATELY 440,000 PEOPLE. RECENT DATA SUGGESTS THAT THE SHALLOW AND DEEP AQUIFERS ARE HYDRAULICALLY CONNECTED. HOWEVER, THE RI/FS SHOWS THAT ONLY THE SHALLOW AQUIFER DIRECTLY UNDER THE MILL SITE ITSELF (OU1) HAS BEEN CONTAMINATED. GROUND WATER ISSUES WILL BE CONSIDERED AS PART OF THE LATER OU1 REMEDY. TO DATE, NONE OF THE PUBLIC WATER SUPPLY WELLS HAVE BEEN CONTAMINATED.

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SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE SHARON STEEL SITE INCLUDES A FORMER MILLING OPERATION ORIGINALLY OWNED AND OPERATED BY THE US SMELTING, REFINING AND MINING COMPANY, LATER KNOWN AS UV INDUSTRIES, INC. THE MILL OPERATED FROM 1906 TO 1971. DURING THE MILLING OPERATION, SULFIDE CONCENTRATES OF LEAD, COPPER, AND ZINC WERE EXTRACTED FROM THE ORE BY FROTH FLOTATION. THE FACILITY OPERATED AS A CUSTOM MILL, RECEIVING ORE FROM MANY SOURCES, THEN CONCENTRATING AND EXTRACTING A VARIETY OF METALS. THE TAILINGS FROM THE MILLING OPERATIONS ARE LOCATED AT THE MILL SITE (OU1) IN UNCOVERED PILES UP TO 50 FEET DEEP, AND HAVE AN ESTIMATED VOLUME OF 14 MILLION CUBIC YARDS. THE TAILINGS ARE FINE GRAINED AND THE PILES RESEMBLE SAND DUNES. SHARON STEEL PURCHASED THE MILL SITE IN 1979.

AN ENVIRONMENTAL HEALTH PROBLEM WAS FIRST SUSPECTED IN 1982 WHEN THE UTAH DEPARTMENT OF HEALTH WAS NOTIFIED THAT LOCAL CITIZENS WERE GATHERING WIND BLOWN TAILINGS AND THEN USING THEM FOR SANDBOXES AND GARDENS. THE TAILINGS HAD HIGH CONCENTRATIONS OF LEAD, CADMIUM, AND ARSENIC. A PUBLIC EDUCATION CAMPAIGN WAS LAUNCHED TO WARN RESIDENTS ABOUT THE DANGERS OF THIS PRACTICE. IN ADDITION TO THE RESIDENTIAL USE OF THE TAILINGS, AN INVESTIGATION IN 1988 REVEALED THAT TAILINGS AND OTHER DUSTS HAD BEEN BLOWN BY THE WIND AND HAD CONTAMINATED THE SOIL WITH LEAD, CADMIUM, AND ARSENIC, OVER A 571 ACRE AREA OF THE CITY OF MIDVALE DOWNWIND OF THE MILL SITE. ANALYSIS OF THE CONTAMINANTS IN THE SOIL STRONGLY SUGGEST THAT A MAJOR CONTRIBUTOR TO OU2 CONTAMINATION IS DUE TO WIND-BLOWN TAILINGS FROM THE SHARON STEEL MILL SITE. SOME OF THE CONTAMINATION MAY ALSO HAVE ORIGINATED FROM THE SMELTER AT AN ADJACENT SUPERFUND SITE (MIDVALE SLAG). OF THE 571 ACRE RESIDENTIAL AREA CONTAMINATED BY THE TAILINGS, FURTHER INVESTIGATIONS HAVE REVEALED THAT ABOUT A 142 ACRE AREA (WITH AN ESTIMATED VOLUME OF 242,000 CUBIC YARDS) HAS SOILS WHICH CONTAIN LEVELS OF LEAD AND/OR ARSENIC ABOVE THE ACTION LEVEL OF 500 PPM LEAD AND/OR 70 PPM ARSENIC.

THE SHARON STEEL SITE, INCLUDING BOTH THE MILL SITE (OU1) AND THE "OFF-SITE" SOILS CONTAMINATED AREAS (OU2), WAS PROPOSED FOR THE SUPERFUND NATIONAL PRIORITIES LIST (NPL) IN 1984 AND BECAME FINAL ON AUGUST 28, 1990. THE STATE OF UTAH WAS THE LEAD AGENCY FOR THE SITE BETWEEN 1985 AND 1987. SINCE 1987, THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS BEEN THE LEAD AGENCY. THE INITIAL REMEDIAL INVESTIGATION (RI) FOR THE SITE WAS COMPLETED IN JUNE 1988. A FEASIBILITY STUDY (FS) FOR THE ENTIRE SITE WAS PUBLISHED IN JUNE 1989, AND A PROPOSED PLAN ISSUED IN JULY 1989. A PUBLIC HEARING ON THIS PROPOSED PLAN WAS HELD IN AUGUST 1989. AS A RESULT OF EXTENSIVE PUBLIC COMMENT, EPA DECIDED TO DIVIDE THE SITE INTO TWO OPERABLE UNITS, WITH OU1 REFERRING TO GROUND WATER, THE MILL SITE, AND ITS TAILINGS, AND OU2 REFERRING TO THE RESIDENTIAL SOILS CONTAMINATED BY WIND BLOWN TAILINGS. THE DECISION TO DIVIDE THE SITE INTO OPERABLE UNITS WAS BASED ON THE ENDANGERMENT PRESENTED BY THE RESIDENTIAL SOILS AND THE NEED TO FURTHER INVESTIGATE THE GROUND WATER BENEATH THE MILL SITE. ISSUANCE OF THE ROD WAS POSTPONED FOR ONE YEAR TO ALLOW ADDITIONAL STUDIES TO ANSWER QUESTIONS POSED BY THE PUBLIC. FURTHER RI/FS STUDIES AND REPORTS CONCERNING GROUND WATER AND RESIDENTIAL SOILS WERE COMPLETED DURING 1989 AND 1990. THE FS FOR OU2 WAS COMPLETED ON JUNE 6, 1990, AND THE PROPOSED PLAN WAS ISSUED ON JUNE 6, 1990. A PUBLIC HEARING WAS HELD ON THE PROPOSED PLAN FOR OU2 ON JUNE 14, 1990, IN MIDVALE, UTAH.

WHILE THE SUPERFUND PROCESS IS UNDERWAY, THE STATE OF UTAH HAS BEEN WORKING WITH SHARON STEEL TO SUPPRESS THE RELEASE OF FUGITIVE DUST FROM THE MILL SITE TO PREVENT FURTHER CONTAMINATION OF THE RESIDENTIAL SOILS AND TO PREVENT RE-CONTAMINATION AFTER IMPLEMENTATION OF THE REMEDY.

THREE POTENTIALLY RESPONSIBLE PARTIES (PRPS) HAVE BEEN IDENTIFIED AT THE SITE. THESE INCLUDE: (1) SHARON STEEL CORPORATION - THE CURRENT OWNER OF THE MILL SITE; (2) UV INDUSTRIES, INC. AND UV INDUSTRIES, INC. LIQUIDATING TRUST - THE FORMER OWNER AND OPERATOR OF THE MILL SITE; AND (3) ATLANTIC RICHFIELD COMPANY - A GENERATOR OF HAZARDOUS SUBSTANCES DISPOSED OF AT THE MILL SITE AND A POTENTIAL FORMER OPERATOR OF THE MILL. GENERAL NOTICE LETTERS WERE SENT TO THE PRPS ON AUGUST 28, 1985; AND REQUESTS FOR INFORMATION WERE SENT ON MAY 12, 1988 (CERCLA 104E). NO SPECIAL NOTICE LETTERS HAVE BEEN SENT. ALL OF THESE PARTIES HAVE BEEN NAMED AS DEFENDANTS IN A FEDERAL LAWSUIT WHICH REQUESTS AS RELIEF REIMBURSEMENT OF RESPONSE COSTS INCURRED AT THE SITE AND INJUNCTIVE RELIEF REQUIRING THE DEFENDANTS TO PERFORM REMEDIATION AT THE SITE. THE US HAS REACHED AN AGREEMENT FOR SETTLEMENT WITH SHARON STEEL AND UV INDUSTRIES. PUBLIC COMMENT IS CURRENTLY UNDERWAY ON THESE TWO CONSENT DECREES. TRIAL AGAINST THE REMAINING DEFENDANT IN THIS CASE IS DUE TO COMMENCE IN OCTOBER 1990.

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HIGHLIGHTS OF COMMUNITY PARTICIPATION

CERCLA (SECTIONS 113(K)(2)(B)(I-V) AND 117) REQUIRES THAT EPA AND THE STATE KEEP THE COMMUNITY INFORMED, AND ALLOW THEM TO PARTICIPATE IN THE DECISION-MAKING PROCESS IN SELECTING A REMEDY FOR A SUPERFUND SITE IN THEIR NEIGHBORHOOD. THE LEGISLATION REQUIRES AT A MINIMUM: (1) NOTICE TO POTENTIALLY AFFECTED PERSONS AND THE PUBLIC; (2) REASONABLE OPPORTUNITY TO COMMENT; (3) AN OPPORTUNITY FOR PUBLIC HEARING; (4) RESPONSE TO EACH SIGNIFICANT COMMENT SUBMITTED; AND (5) A STATEMENT OF THE BASIS AND PURPOSE OF THE SELECTED ACTION.

THIS SECTION DESCRIBES THE SPECIFIC COMMUNITY PARTICIPATION ACTIVITIES WHICH OCCURRED IN THE PROCESS OF SELECTING A REMEDY FOR THIS OPERABLE UNIT. THESE ACTIVITIES NOT ONLY MEET THE MINIMUM REQUIREMENTS BUT EXCEED THEM SIGNIFICANTLY, INDICATING A COMMITMENT BY EPA AND THE STATE OF UTAH TO MEET BOTH THE LETTER OF THE LAW AND THE SPIRIT OF COMMUNITY PARTICIPATION AT THIS SITE. IN ADDITION, THIS RECORD OF DECISION (ROD) DOCUMENT FULFILLS TWO REQUIREMENTS OF CERCLA: (1) IT CONTAINS A RESPONSE TO EACH COMMENT SUBMITTED BY THE PUBLIC (SEE THE RESPONSIVENESS SUMMARY SECTION OF THIS DOCUMENT); AND (2) IT PROVIDES A STATEMENT OF THE BASIS AND PURPOSE OF THE REMEDY.

1982 - THE UTAH DEPARTMENT OF HEALTH ADVISED THE PUBLIC AGAINST REMOVING TAILINGS FROM THE SITE FOR USE IN LANDSCAPING, GARDENS, AND SAND BOXES AT THEIR HOMES.

1983 - COMMUNITY INTERVIEWS WERE HELD FOR THE PURPOSE OF WARNING NEARBY RESIDENTS ABOUT USING TAILINGS FOR SAND BOXES AND GARDENS AND A PRESS RELEASE WAS ISSUED DETAILING THE POTENTIAL FOR THE SITE TO BE LISTED. SHORTLY AFTERWARDS, ANOTHER PRESS RELEASE WARNED PEOPLE NOT TO GARDEN IN SOILS CONTAINING TAILINGS.

1984 - SHARON STEEL SITE PROPOSED FOR THE NPL.

1985 - A FACT SHEET, WHICH BRIEFLY DESCRIBED THE SITE AND POTENTIAL CONTAMINATION, WAS MAILED TO MIDVALE RESIDENTS NEAR THE SITE. INTERVIEWS WERE ALSO CONDUCTED WITH RESIDENTS OF MIDVALE. THE MIDVALE CITY COUNCIL CREATED THE TAILINGS COMMITTEE, LATER CALLED THE COMMUNITY LIAISON COUNCIL, TO DISSEMINATE SITE INFORMATION TO INTERESTED CITIZENS.

1986 - THE STATE MET WITH LOCAL OFFICIALS AND THE COMMUNITY LIAISON COUNCIL TO DISCUSS PUBLIC CONCERNS REGARDING THE SITE. AS A RESULT OF THESE DISCUSSIONS, THE STATE POSTED SIGNS IN ASIAN AND ENGLISH LANGUAGES TO WARN AGAINST SITE ENTRY; DISTRIBUTED PAMPHLETS TO AREA RESIDENTS WARNING AGAINST SITE ACCESS; AND CONDUCTED AN EPIDEMIOLOGICAL SURVEY OF THE NEIGHBORING ASIAN POPULATION TO EVALUATE CONCERNS REGARDING HEALTH EFFECTS.

1987 - EPA AND THE STATE OF UTAH MET WITH MIDVALE OFFICIALS TO ESTABLISH INFORMATION REPOSITORIES. THE REPOSITORIES IDENTIFIED WERE THE RUTH VINE TYLER LIBRARY IN MIDVALE, MIDVALE CITY HALL, AND THE UTAH DEPARTMENT OF HEALTH. MEETING LOCATIONS WERE IDENTIFIED AS THE MIDVALE CITY AUDITORIUM, MIDVALE MIDDLE SCHOOL, HILLCREST HIGH SCHOOL, UTAH POWER AND LIGHT AUDITORIUM, AND MIDVALE BOWERY. A FACT SHEET, MAILED OUT IN SEPTEMBER, 1987, SUMMARIZED EPA'S SUPERFUND PROCESS AND DESCRIBED THE STUDY BEING CONDUCTED.

AUGUST 1988 - INCLUDED COMPLETION OF THE FINAL COMMUNITY RELATIONS PLAN. ALSO A FACT SHEET UPDATE WAS MAILED TO MIDVALE RESIDENTS IN MAY WHILE ANOTHER FACT SHEET WAS MAILED IN AUGUST WHICH SUMMARIZED THE FINDINGS OF THE EPA'S REMEDIAL INVESTIGATION (RI).

FEBRUARY 1989 - A PRESS RELEASE WAS SENT OUT ON THE FENCING OF THE SITE.

JUNE 1989 - ANOTHER PRESS RELEASE CLARIFIED THE DECISION PROCESS ON CLEAN UP OF THE SITE. IN THE SAME MONTH, A PRESS RELEASE WAS ISSUED ANNOUNCING THE PREFERRED ALTERNATIVE AND PROPOSED PLAN AND THE DATES OF THE COMMENT PERIOD AND PUBLIC MEETING DATE AND LOCATION. ALSO, THIS SAME INFORMATION WAS ADVERTISED IN THE THREE LOCAL PAPERS ON JUNE 14. THE SITE AT THIS TIME WAS CONSIDERED ONE OPERABLE UNIT (OU).

JULY 1989 - A FACT SHEET, PROPOSED PLAN FOR SHARON STEEL/MIDVALE TAILINGS SITE, WAS MAILED TO 1200 RESIDENTS IN MIDVALE. THE COMMUNITY RELATIONS PLAN WAS REVISED ON JULY 31.

AUGUST 1989 - PRIOR TO THE PUBLIC MEETING AT THE MIDVALE BOWERY ON AUGUST 17, THE PUBLIC MEETING WAS ADVERTISED AND A PRESS RELEASE ISSUED. ON AUGUST 16, A CONGRESSIONAL BRIEFING WAS HELD, TWO EDITORIAL BOARD MEETINGS WERE HELD, AND A MEETING WITH THE STATE HEALTH DEPARTMENT OCCURRED.

SEPTEMBER 1989 - AS A RESULT OF COMMENTS GIVEN TO EPA ON THE PROPOSED PLAN FOR THE SHARON STEEL/MIDVALE SITE, THE PREFERRED ALTERNATIVE WAS NOT ACCEPTED. EPA EXTENDED THE STUDY PERIOD AND THE PUBLIC COMMENT PERIOD FOR THE SITE, IDENTIFIED A SEPARATE OU FOR RESIDENTIAL SOIL, AND ISSUED A PRESS RELEASE TO ANNOUNCE THESE CHANGES.

NOVEMBER 1989 - INTERVIEWS WERE CONDUCTED ON NOVEMBER 6,7, AND 8, WITH MIDVALE RESIDENTS AND BUSINESS PEOPLE TO DETERMINE WHAT CONCERNS THEY MIGHT HAVE WITH REGARD TO THE SHARON STEEL SITE. ON THE 28TH OF NOVEMBER, EPA'S REGIONAL ADMINISTRATOR (RA) MET WITH THE UTAH DEPARTMENT OF HEALTH, DESERET NEWS EDITORIAL BOARD, SALT LAKE CITY TRIBUNE EDITORIAL BOARD, AND UTAH GOVERNOR NORMAN BANGERTER. THE SAME DAY, EPA AND THE STATE HOSTED PUBLIC FORUM #1, WHICH WAS HELD AT THE UTAH POWER AND LIGHT AUDITORIUM. THE MEETING WAS ADVERTISED IN THE LOCAL PAPER, AND A PRESS RELEASE WAS ISSUED. EPA AND THE GOVERNOR OF UTAH JOINTLY SENT OUT AN INVITATION TO SELECTED OFFICIALS AND INTERESTED PARTIES INVITING THEM TO ATTEND. AT THE MEETING, A STATUS REPORT WAS GIVEN ON SITE INVESTIGATIONS AND STUDIES. A PLAN FOR RESPONDING TO PUBLIC COMMENT WAS DEVELOPED. EPA THEN ANNOUNCED THAT ADDITIONAL STUDIES ON SOILS AND GROUND WATER WOULD BE CONDUCTED IN RESPONSE TO PUBLIC COMMENT RECEIVED DURING THE AUGUST 1989, PUBLIC HEARING.

JANUARY 1990 - A FACT SHEET, QUESTIONS AND ANSWERS ABOUT LEAD AND ARSENIC IN THE SOILS, WAS DEVELOPED AND MAILED TO OVER 1200 MIDVALE RESIDENTS BY EPA. ALSO, IN JANUARY, AN ADVERTISEMENT WAS PLACED IN THE DAILY PAPERS BY EPA ANNOUNCING CRITERIA FOR SUBMITTAL OF PRIVATE INDUSTRY TAILINGS REPROCESSING PROPOSALS; AND A PRE-PROPOSAL CONFERENCE WAS HELD WITH REPROCESSORS IN SALT LAKE CITY. THE DECISION TO BREAK THE SITE INTO OU1 AND OU2 WAS MADE AT THIS TIME.

FEBRUARY 1990 - PUBLIC FORUM #2 WAS HELD IN MIDVALE FOR THE PURPOSE OF UPDATING RESIDENTS ON GROUND WATER INVESTIGATIONS, PRIVATE INDUSTRY REPROCESSING PROPOSALS, SOILS INVESTIGATIONS, AND SETTING SOIL ACTION LEVELS. THIS WAS ADVERTISED IN THE LOCAL NEWSPAPER; EPA AND THE UTAH DEPARTMENT OF HEALTH JOINTLY SENT OUT INVITATION LETTERS TO SELECTED OFFICIALS AND INTERESTED PARTIES; A PRESS RELEASE WAS ISSUED ANNOUNCING THE MEETING; AND THE MEETING WAS HIGHLIGHTED IN THE JANUARY FACT SHEET. AS A RESULT OF THE INTERVIEWS CONDUCTED IN NOVEMBER 1989, THE COMMUNITY RELATIONS PLAN WAS REVISED FEBRUARY 12, 1990.

MARCH 1990 - ANOTHER FACT SHEET, RI/FS PROJECT STATUS REPORT, WAS MAILED TO MIDVALE RESIDENTS. TWELVE REPROCESSING PROPOSALS WERE RECEIVED AND EVALUATED; NUMEROUS TELEPHONE CONTACTS BETWEEN REPROCESSORS AND EPA OCCURRED.

MAY 1990 - A SOILS DATA LETTER WAS SENT TO OVER 200 MIDVALE RESIDENTS GIVING THE RESULTS OF THE SOIL SAMPLING ON THEIR PROPERTIES. AVAILABILITY SESSIONS WERE SCHEDULED ALL DAY AND EVENING MAY 22, AND ALL DAY MAY 23, TO ANSWER AND INTERPRET THE INDIVIDUAL SOIL DATA RESULTS. A FEASIBILITY STUDY (FS) MEETING WAS SCHEDULED THE SAME NIGHT TO ANSWER QUESTIONS AND HEAR CONCERNS PRIOR TO THE PUBLIC MEETING.

JUNE 1990 - AN ADVERTISEMENT WAS PLACED IN THE DAILY AND LOCAL PAPERS ANNOUNCING THE PROPOSED PLAN FOR OU2. A FEW DAYS PRIOR TO THIS, A FACT SHEET, PROPOSED PLAN FOR OPERABLE UNIT 2: RESIDENTIAL SOILS, WAS MAILED TO MIDVALE RESIDENTS. A PUBLIC MEETING ON OU2 RESIDENTIAL SOILS WAS HELD ON JUNE 14. A PRESS RELEASE WAS ISSUED ANNOUNCING THE MEETING AND APPROXIMATELY EIGHTY PEOPLE ATTENDED. RI/FS REPORTS FOR OU2 WERE PLACED IN REPOSITORIES FOR PUBLIC REVIEW.

JULY 1990 - PRPS REQUESTED AN EXTENSION PERIOD ON THE PUBLIC COMMENT, AND EPA PLACED AN ADVERTISEMENT IN THE DAILY AND LOCAL NEWSPAPERS ANNOUNCING THE ADDITIONAL THIRTY DAY EXTENSION (ENDING AUGUST, 1990).

AUGUST 1990 - A CONGRESSIONAL BRIEFING WAS HELD WITH CONGRESSIONAL AIDES TO DISCUSS SITE STUDIES IN PROGRESS WITH SPECIFIC EMPHASIS ON THE REPROCESSING PROPOSAL EVALUATION PROCESS. THE MAYOR OF MIDVALE WAS IN ATTENDANCE, AND THE MAYOR OF WEST JORDAN WAS INVITED BUT DID NOT ATTEND. RESPONSES TO PUBLIC COMMENTS REGARDING OU2 WERE BEGUN.

IN ADDITION TO THE ABOVE SPECIFIED HIGHLIGHTS, EPA AND THE STATE OF UTAH COOPERATED THROUGHOUT 1989 AND 1990 TO CONDUCT THE FOLLOWING ACTIVITIES ON NUMEROUS OCCASIONS:

- EPA AND THE STATE MET NUMEROUS TIMES WITH MIDVALE OFFICIALS TO DISCUSS THE STATUS OF EPA AND STATE ACTIVITIES.
- A LIST OF CONTACTS AND INTERESTED PARTIES WAS MADE AND KEPT UPDATED. THE LIST INCLUDES UTAH FEDERAL SENATORS AND CONGRESSMEN, STATE ELECTED OFFICIALS, UTAH DEPARTMENT OF HEALTH OFFICIALS,

AREA MEDIA, AND INTERESTED GROUPS AND INDIVIDUALS, AS WELL AS A MIDVALE MAILING LIST OF OVER 1200 RESIDENTS.

- A TECHNICAL ADVISORY COMMITTEE (TAC) WAS FORMED OCTOBER 19, 1989, IN RESPONSE TO COMMENTS AT THE AUGUST 1989, PUBLIC MEETING TO KEEP PARTICIPANTS, RESIDENTS, AND OTHER INTERESTED PARTIES INFORMED REGARDING TECHNICAL ACTIVITIES AND PROJECT STATUS AT THE SHARON STEEL/MIDVALE TAILINGS SITE. THE TAC, WHICH CONSISTED OF REPRESENTATIVES FROM THE UTAH STATE DEPARTMENT OF HEALTH, SALT LAKE CITY AND COUNTY HEALTH DEPARTMENT, PRPS, REPRESENTATIVES FROM MIDVALE CITY GOVERNMENT, US GEOLOGICAL SURVEY, AND THE US BUREAU OF RECLAMATION, GENERALLY MET ONE TO TWO TIMES PER MONTH. THESE MEETINGS WERE HELD TO DISCUSS PROJECT STATUS, ON-GOING TECHNICAL STUDIES, FUTURE STUDIES, AND CURRENT DATA INTERPRETATIONS IN AN EFFORT TO RESOLVE TECHNICAL DIFFERENCES IN OPINION OR APPROACH AS THEY AROSE.

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SCOPE AND ROLE OF THIS OPERABLE UNIT WITHIN SITE STRATEGY

THERE ARE TWO OPERABLE UNITS WITHIN THE SHARON STEEL SUPERFUND SITE: OU1 IS THE MILL SITE WITH ITS ASSOCIATED TAILINGS PILES, MILL BUILDINGS, AND MILLING FACILITIES; AND OU2 IS THE RESIDENTIAL AND COMMERCIAL AREA OF MIDVALE, UTAH, CONTIGUOUS TO THE SITE, WHERE SOILS HAVE BEEN CONTAMINATED WITH WINDBLOWN MILL TAILINGS. THE SELECTED REMEDY FOR OU2 INVOLVES EXCAVATION OF THE CONTAMINATED SOILS AND TEMPORARY STORAGE OF THESE SOILS ON THE OU1 MILL SITE PROPERTY. THE TAILINGS AND CONTAMINATED SOILS FOR BOTH OPERABLE UNITS WILL THEN BE ADDRESSED BY A REMEDIAL ACTION TO BE PROPOSED IN MARCH, 1991. DEPENDING ON THE REMEDY SELECTED, THE TAILINGS AND SOILS MAY BE TREATED SIMILARLY OR IN DIFFERENT WAYS. IN ORDER TO EXPEDITE A REMEDY WHICH WILL PROTECT THE ENVIRONMENT AND PUBLIC HEALTH, THE CONTAMINATED SOILS IN OU2 WILL BE REMOVED TO MINIMIZE DIRECT CONTACT WITH THE POPULATION WHILE THE REMEDY AT OU1 IS BEING SELECTED AND DESIGNED. THE PRINCIPAL THREAT TO HUMAN POPULATIONS INVOLVES DIRECT CONTACT WITH CONTAMINATED SOILS. REMOVAL OF THE CONTAMINATION FROM THEIR PROPERTIES AND HOMES WILL SUBSTANTIALLY REDUCE THEIR CURRENT EXPOSURE. LATER ACTION AT THE MILL SITE (OU1) WILL ADDRESS FUTURE EXPOSURES.

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SUMMARY OF SITE CHARACTERISTICS

AS PREVIOUSLY DESCRIBED, THE SOILS IN PORTIONS OF THE CITY OF MIDVALE HAVE BEEN CONTAMINATED WITH HIGH LEVELS OF LEAD, ARSENIC, CADMIUM, AND OTHER TOXIC METALS IN LESSER QUANTITIES (SEE FIGURE 2). A MAJOR SOURCE OF THESE METALS ARE THE TAILINGS AT THE SHARON STEEL MILL SITE. FOR MANY YEARS, THE TAILINGS FROM THE MILL SITE (OU1) HAVE BEEN BLOWN BY THE WIND AND THEN DEPOSITED IN SOILS THROUGHOUT THE COMMUNITY. SUPERIMPOSED ON THIS WIDE AREAL CONTAMINATION ARE AREAS OF HIGHLY ELEVATED CONTAMINATION, WHERE UNSUSPECTING RESIDENTS MAY HAVE USED TAILINGS FOR FILL, SANDBOXES, AND GARDENS. THERE ARE A NUMBER OF WAYS THE CONTAMINATION CAN MIGRATE: (1) THE SOIL CAN BE BLOWN BY THE WIND AND BE DEPOSITED IN ADJACENT AREAS; (2) THE SOIL CAN BE DISTURBED BY MAN'S ACTIVITIES WHICH COULD EXTEND THE DEPTH OF CONTAMINATION; (3) THE DUST TRANSPORTED BY THE WIND CAN ENTER HOMES AND BUILDINGS; (4) CONTAMINANTS IN THE SOIL CAN BE INCORPORATED INTO PLANTS DURING GROWTH; (5) EARTHWORMS CAN REDISTRIBUTE THE CONTAMINANTS IN THE SOIL; (6) ADULTS AND CHILDREN CAN COME IN DIRECT CONTACT WITH THE CONTAMINATION AND TRANSPORT SOIL ON THEIR BODIES, CLOTHING, WORK BOOTS, AND TOOLS; AND (7) PETS GET THE CONTAMINATION ON THEIR FUR AND CARRY IT WITH THEM. TRANSPORT OF THE CONTAMINATION TO THE GROUND WATER IS NOT CONSIDERED TO BE A SIGNIFICANT PATHWAY OF POLLUTANT MIGRATION AT OU2, BECAUSE THE AREA IS ARID, THE CONTAMINATED LAYER IS THINNER, AND THE SOILS HAVE LOWER LEVELS OF ARSENIC THAN THE TAILINGS ON THE MILL SITE. IT IS ESTIMATED THAT THE VOLUME OF CONTAMINATED SOILS WITH LEAD AND ARSENIC LEVELS IN EXCESS OF 500 PPM LEAD AND/OR 70 PPM ARSENIC (THE ACTION LEVELS) IS 242,000 CUBIC YARDS. THE TAILINGS AT THE MILL SITE AVERAGE 5470 PPM LEAD AND 320 PPM ARSENIC. BACKGROUND SOIL CONCENTRATIONS FOR THIS AREA ARE LESS THAN 100 PPM LEAD AND LESS THAN 20 PPM ARSENIC. IN THE OU2 STUDY AREA, THE SURFACE SOILS HAD LEAD CONCENTRATIONS RANGING FROM 33.8 PPM TO 7,210 PPM, WITH A MEAN OF 839 PPM. THE ARSENIC CONCENTRATIONS IN THE SURFACE SOILS RANGED FROM 3.5 PPM TO 3,520 PPM WITH A MEAN OF 101 PPM. THE ACTION LEVELS FOR BOTH LEAD AND ARSENIC WERE DETERMINED AS A PART OF THE BASELINE RISK ASSESSMENT AS DESCRIBED LATER.

LEAD IS A TOXIC ELEMENT KNOWN TO CAUSE NEUROLOGIC DISORDERS. LEAD EXPOSURE IS OF CONCERN PARTICULARLY FOR CHILDREN, WHEN THE BRAIN IS RAPIDLY DEVELOPING, AND DURING THE PRENATAL PERIOD. ARSENIC IS ALSO A TOXIC ELEMENT, AND A KNOWN CARCINOGEN. WHEN INHALED, IT CAUSES LUNG CANCER; WHEN INGESTED IT HAS BEEN ASSOCIATED WITH SKIN, COLON, AND BLADDER CANCERS. MORE DETAIL IS GIVEN LATER IN THIS DOCUMENT.

THE RI/FS CONCLUDED THAT THE SOILS IN ABOUT HALF THE AREA STUDIED WOULD REQUIRE REMOVAL TO PREVENT CONTINUED EXPOSURES TO EXCESSIVE LEVELS OF LEAD AND ARSENIC. THIS AMOUNTED TO AN AREA OF 6.17 MILLION SQUARE FEET OR 142 ACRES OF SURFACE CONTAMINATION. IT IS ESTIMATED THAT CONTAMINATION EXTENDS DOWN TO AT LEAST 6 INCHES OVER A 119 ACRE AREA AND DOWN TO AT LEAST 12 INCHES OVER A 14 ACRE AREA. THESE AREAS ARE ESTIMATES BASED ON STATISTICAL MODELING OF THE CONTAMINATION. EACH PROPERTY WILL BE TESTED INDIVIDUALLY AT EACH DEPTH BEFORE REMEDIATION OF THAT PROPERTY.

THERE ARE APPROXIMATELY 510 BUILDINGS WITHIN THE CONTAMINATED AREA, 380 OF WHICH ARE RESIDENTIAL HOMES, 35 ARE APARTMENT COMPLEXES, AND 95 ARE COMMERCIAL BUILDINGS. APPROXIMATELY 2500 PEOPLE LIVE IN THE IMPACTED AREA. THE AREAL EXTENT OF THE CONTAMINATION IS SHOWN IN FIGURE 2.

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SUMMARY OF SITE RISKS

EXPOSURE PATHWAYS

AS DESCRIBED EARLIER, THE PRIMARY SOURCE OF THE HUMAN EXPOSURE IN THE SHARON STEEL OU2 AREA IS THE CONTAMINATED SOIL SURROUNDING THE RESIDENCES AND COMMERCIAL ESTABLISHMENTS IN THE AREA. HUMANS, PARTICULARLY CHILDREN, ARE EXPOSED TO THE CONTAMINATED SOILS IN A VARIETY OF WAYS.

- A. INGESTION OF TAILINGS BY CHILDREN PLAYING IN SANDBOXES FILLED WITH THE SANDY TAILINGS WAS THE EXPOSURE PATHWAY THAT FIRST BROUGHT THIS SITE TO THE ATTENTION OF STATE AUTHORITIES. THE STATE DEPARTMENT OF HEALTH LAUNCHED AN EDUCATIONAL PROGRAM TO DISCOURAGE THE PEOPLE FROM USING TAILINGS FOR THIS PURPOSE. THIS EXPOSURE PATHWAY WAS NOT USED IN SETTING THE ACTION LEVELS, BECAUSE THIS PRACTICE IS NOW RARE AMONG THE RESIDENTS.
- B. SOIL INGESTION IS ANOTHER WAY CHILDREN ARE EXPOSED. ALTHOUGH CHILDREN HAVE BEEN SHOWN TO ACTUALLY EAT DIRT, THE USUAL METHOD OF INGESTION OF CONTAMINATED SOIL ARISES FROM EATING WITH DIRTY HANDS, PUTTING DIRTY HANDS IN THEIR MOUTHS, AND PUTTING TOYS OR OTHER OBJECTS, WHICH ARE DIRTY WITH SOIL, IN THEIR MOUTHS.
- C. INDOOR DUST INGESTION OCCURS BECAUSE OUTDOOR FUGITIVE DUST FROM CONTAMINATED SOILS PENETRATES BUILDINGS, LEAVING CONTAMINATED DUSTS. AGAIN EVEN CHILDREN PLAYING INDOORS CAN GET DIRTY WITH THESE DUSTS AND INGEST THE DUST IN THE SAME MANNER AS DESCRIBED FOR THE OUTDOOR SOILS.
- D. THE CONTAMINATED SOIL AND INDOOR DUST CAN BECOME AIRBORNE AND BE INHALED BY THE RESIDENTS.
- E. A NUMBER OF RESIDENTS HAVE VEGETABLE GARDENS AND DEPEND ON HOME-GROWN VEGETABLES AS A FOOD SOURCE DURING CERTAIN SEASONS OF THE YEAR. THE VEGETABLES MAY BE USED ALL YEAR LONG IF CANNED OR FROZEN FOLLOWING THE HARVEST. BECAUSE SOILS MAY CONTAMINATE THE SURFACE OF THE VEGETABLE, THE STATE HEALTH DEPARTMENT RECOMMENDS WASHING OF THE VEGETABLES. THIS, HOWEVER, DOES NOT AFFECT THE PORTION OF THE CONTAMINATION CONCENTRATED WITHIN THE VEGETABLES THEMSELVES, THE CONTAMINATION HAVING BEEN TRANSPORTED FROM THE SOIL THROUGH THE ROOT SYSTEMS, INTO THE EDIBLE PORTIONS OF THE VEGETABLES.
- F. SOME BACKGROUND EXPOSURE FROM FOOD AND DRINK IS NOT RELATED TO THE SITE ITSELF, BUT STEMS FROM CONTAMINANTS OUTSIDE THE AREA. THIS SOURCE OF EXPOSURE AFFECTS PEOPLE WORLD-WIDE. SOURCES WITHIN MIDVALE ARE SUPERIMPOSED ON THIS BACKGROUND. BACKGROUND IN THIS CASE DOES NOT REFER TO "NATURAL" LEVELS. FOR COMPARATIVE PURPOSES, THE BACKGROUND IS LISTED AS A SOURCE.

A COMPARISON OF THE VARIOUS DAILY INTAKE RATES, AS REPORTED IN THE FS, SHOWS THAT INGESTION OF HOUSEHOLD DUST AND INGESTION OF HOMEGROWN PRODUCE ARE THE MOST SIGNIFICANT EXPOSURE PATHWAYS (SEE TABLE 1).

EFFECTS OF EXPOSURE TO CONTAMINANTS

THE TWO CONTAMINANTS OF PRIMARY CONCERN AT THIS SITE ARE LEAD AND ARSENIC. THE MAJOR ADVERSE HEALTH EFFECTS ASSOCIATED WITH LEAD ARE ALTERATIONS INTO BLOOD AND NERVES. EXPOSURE TO HIGH LEVELS OF LEAD LEADS TO SEVERE LEAD POISONING WHICH MAY INCLUDE COMA, CONVULSIONS, PROFOUND AND IRREVERSIBLE MENTAL RETARDATION AND SEIZURES, AND EVEN DEATH. LESS SEVERE EFFECTS AT LOWER DOSAGES INCLUDE DAMAGE TO RECEPTOR NERVES, ANEMIA, DELAYED COGNITIVE DEVELOPMENT, REDUCED IQ, HIGH BLOOD PRESSURE, AND IMPAIRED HEARING. EVEN SMALLER DOSAGES HAVE BEEN IMPLICATED IN ENZYME INHIBITION, CHANGES IN RED BLOOD CELL CHEMISTRY, INTERFERENCE WITH VITAMIN D METABOLISM, COGNITIVE DYSFUNCTION IN INFANTS, CHANGES IN THE ABILITY OF NERVES TO TRANSMIT SIGNALS, AND REDUCED CHILDHOOD GROWTH. BECAUSE THEIR NERVOUS SYSTEMS ARE STILL DEVELOPING, FETUSES AND CHILDREN 0 - 3 YEARS OF AGE ARE MOST AFFECTED BY THE LOWER DOSES AND ARE, THEREFORE, THE MOST SENSITIVE POPULATION. A COMPILATION SUMMARIZING THE VARIOUS EFFECTS NOTED IN THE LITERATURE ALONG WITH THE BLOOD LEAD LEVEL CONCENTRATIONS AT WHICH THESE EFFECTS OCCURRED IS GIVEN IN THE BASELINE RISK ASSESSMENT REPORT OF THE FS.

ARSENIC ALSO IS A WELL KNOWN POISON. ACUTE INHALATION EXPOSURE PRODUCES SEVERE IRRITATION OF NASAL MUCOSA, LARYNX, AND BRONCHI, REVERSIBLE EFFECTS OF BLOOD, AND CARDIOVASCULAR SYSTEM, AND DISTURBANCES OF RECEPTOR NERVES. CHRONIC ORAL EXPOSURE OF HUMANS TO ARSENIC CAN PRODUCE TOXIC EFFECTS ON THE ENTIRE NERVOUS SYSTEM, AGE SPOTS AND WARTS, THICKENING AND DARKENING OF THE SKIN, SKIN LESIONS, BLOOD DAMAGE, AND CARDIOVASCULAR DAMAGE. IN ADDITION, ARSENIC IS A KNOWN HUMAN CARCINOGEN. INHALATION OF ARSENIC HAS BEEN LINKED TO LUNG CANCER IN SMELTER WORKERS. INGESTION OF ARSENIC HAS BEEN LINKED TO A FORM OF SKIN CANCER AND MORE RECENTLY TO BLADDER, LIVER, AND LUNG CANCER.

CADMIUM, WHEN INGESTED, HAS BEEN SHOWN TO BE ASSOCIATED WITH KIDNEY DISEASE, BONE DAMAGE, HIGH BLOOD PRESSURE, ANEMIA, AND SUPPRESSION OF THE IMMUNE SYSTEM. INHALATION OF CADMIUM HAS BEEN IMPLICATED IN DEVELOPMENT OF EMPHYSEMA AND LUNG CANCER. THE DOSES ASSOCIATED WITH THESE EFFECTS WERE USED TO CALCULATE RISKS: FOR LEAD, CENTRAL NERVOUS SYSTEM EFFECTS: FOR ARSENIC, SKIN EFFECTS: AND FOR CADMIUM, KIDNEY EFFECTS.

RISK CHARACTERIZATION

FOR THIS SITE, THE RISKS WERE CHARACTERIZED USING THREE APPROACHES: (1) BLOOD LEAD CONCENTRATIONS; (2) INCREASED RISK OF CANCER DUE TO EXPOSURE TO ARSENIC; AND (3) USE OF A HAZARD INDEX WHICH COMPARES ESTIMATED DAILY INTAKE RATES AT THE SITE TO A SAFE AMOUNT OR REFERENCE DOSE (FOR AILMENTS OTHER THAN CANCER). A SUMMARY OF THIS ASSESSMENT IS GIVEN IN TABLE 1.

ACTION LEVEL DERIVATION

SINCE THE EXPOSURE ASSESSMENT AND RISK CHARACTERIZATION INDICATED THAT THE TARGETS FOR ACCEPTABLE RISKS WERE EXCEEDED FOR LEAD, ARSENIC, AND CADMIUM, THE INTEGRATED UPTAKE BIOKINETIC MODEL (IU/BK) FOR LEAD, THE CANCER RISK ASSESSMENT FOR ARSENIC, AND THE HAZARD INDICES FOR ARSENIC AND CADMIUM WERE USED TO PREDICT WHAT SOIL CONCENTRATIONS WOULD HAVE TO BE IN ORDER TO BRING EXPOSURE RISKS TO AN ACCEPTABLE TARGET. THESE CALCULATIONS WERE FULLY DESCRIBED IN THE FS FOR SHARON STEEL OU2 IN THE RECOMMENDED HEALTH-BASED SOIL ACTION LEVELS FOR RESIDENTIAL SOILS SECTION. IN ORIGINAL CALCULATIONS, THE IU/BK FOR LEAD PREDICTED THAT AN ACTION LIMIT OF 500 PPM LEAD IN SOILS WAS NECESSARY TO ACHIEVE A TARGET OF 12.5 UG LEAD/DL OF BLOOD FOR 95 PERCENT OF THE CHILDREN 0 - 3 YEARS OF AGE. THE CANCER RISK AND HAZARD INDEX CALCULATIONS SHOWED THAT AN ACTION LIMIT OF 70 PPM ARSENIC WAS REQUIRED TO REDUCE THE EXPOSURE OF RESIDENTS TO AN ACCEPTABLE LEVEL. AN ACTION LIMIT FOR CADMIUM WAS NOT CALCULATED SINCE IT WAS DISCOVERED THAT THE DISTRIBUTION OF ALL THREE CONTAMINANTS OF CONCERN HAD SIMILAR PATTERNS AND CLEAN UP OF LEAD AND ARSENIC TO THEIR ACTION LEVELS WOULD ACCOMPLISH CLEAN UP FOR CADMIUM AS WELL.

DURING THE PUBLIC COMMENT PERIOD, ONE OF THE PRPS NOTED THAT THERE WAS A COMPUTER SOFTWARE ERROR IN THE IU/BK AND ALSO THAT LOCAL DATA ON STATISTICAL DISTRIBUTIONS OF BLOOD LEAD SHOULD BE USED. IN ADDITION, SINCE THE ACTION LEVELS FOR THE SHARON STEEL/MIDVALE SITE WERE RECOMMENDED IN APRIL 1990, EPA REGION VIII HAS RECEIVED GUIDANCE FROM EPA'S OFFICE OF EMERGENCY AND REMEDIAL RESPONSE AND THE OFFICE OF AIR QUALITY PLANNING AND STANDARDS INDICATING THAT A TARGET BLOOD LEAD LEVEL OF 10 UG/DL IS APPROPRIATE FOR PROTECTION OF HUMAN HEALTH. EPA'S REGION X HAS ALREADY USED THE 10 UG/DL GOAL AS A TARGET LEVEL FOR BLOOD LEAD IN CALCULATING ACTION LEVELS AT THE BUNKER HILL SITE IN IDAHO. IN RESPONSE TO THESE CONCERNS, EPA RECALCULATED THE ACTION LEVEL FOR LEAD USING THE TARGET OF 10 UG LEAD/DL OF BLOOD FOR THE MOST SENSITIVE AGE GROUP, 0 - 3 YEARS OF AGE. THE FOLLOWING ASSUMPTIONS WERE USED: (1) GEOMETRIC MEAN OF DRINKING WATER FROM THE SITE; (2) GEOMETRIC STANDARD DEVIATION IN BLOOD LEAD LEVELS FROM RESIDENTS AT THE SITE; (3) THE RELATIONSHIP BETWEEN LEAD IN EXTERIOR SOIL WITH INTERIOR HOUSE DUST (CONCENTRATIONS WERE ASSUMED TO BE APPROXIMATELY EQUAL AT 500 PPM); AND (4) AN ABSORPTION RATE OF LEAD FROM DUST OF 25 PERCENT IN THE GASTROINTESTINAL TRACT (FOR CONSISTENCY WITH THE MODEL'S VALIDATION EFFORTS). PORTIONS OF THESE CALCULATIONS WERE PERFORMED BY HAND TO AVOID USE OF THE ERRANT SOFTWARE.

THE RESULT OF THESE NEW MODELING EFFORTS INDICATES THAT, AT A CLEAN-UP LEVEL OF 500 MG/KG, 11 PERCENT OF CHILDREN MIGHT EXCEED THE TARGET BLOOD LEAD LEVEL OF 10 UG/DL.

REDUCTION OF RISKS TO HUMAN HEALTH AND THE ENVIRONMENT THROUGH IMPLEMENTATION OF THE SELECTED REMEDY

THE SELECTED REMEDY IS EFFECTIVE IN ACHIEVING THE HUMAN HEALTH GOALS OF EPA. TABLE 2 ILLUSTRATES HOW THE EXPOSURE TO LEAD WILL BE REDUCED AFTER IMPLEMENTATION OF THE SELECTED REMEDY. DURING CURRENT CONDITIONS, THE CHILDREN MAY INTAKE A MAXIMUM OF 770 UG/DAY OF LEAD. THIS LEVEL OF EXPOSURE DOES NOT INCLUDE PLAYING IN SANDBOXES FILLED WITH TAILINGS BECAUSE THE UTAH STATE HEALTH DEPARTMENT HAS GREATLY REDUCED THIS PRACTICE THROUGH AN EDUCATIONAL PROGRAM. THE PRIMARY ROUTE OF EXPOSURE IS INGESTION OF LEAD FROM HOMEGROWN PRODUCE, FOLLOWED BY INGESTION OF HOUSEHOLD DUST. AFTER REMEDIATION, THE MAXIMUM LEAD INTAKE SHOULD BE REDUCED TO 59 UG/DAY FOR CHILDREN NOT EATING HOMEGROWN VEGETABLES AND 88 UG/DAY FOR CHILDREN WHO CONSUME 14 PERCENT OF THEIR TOTAL VEGETABLES FROM CURRENT HOME GARDENS. EPA MODELING SUGGESTS THAT AFTER REMEDIATION, THERE SHOULD BE FEW CHILDREN WITH BLOOD LEAD LEVELS EXCEEDING 10 UG/DL, THE GOAL OF REMEDIATION FOR LEAD. TABLE 8 PRESENTS RESULTS FROM THE LEAD INTAKE MODELING EXERCISES AS DETAILED IN THE ACTION LEVEL DOCUMENT OF THE SHARON STEEL FS.

THE SELECTED REMEDY WILL ALSO REDUCE CARCINOGENIC AND NON-CARCINOGENIC EFFECTS FROM EXPOSURE TO ARSENIC. TABLE 3 ILLUSTRATES THAT THE CURRENT RISK OF CANCER FROM ARSENIC EXPOSURE IS $5 \times (10^{-4})$. THIS IS GREATER THAN THE ACCEPTABLE CANCER RISK RANGE DEFINED BY EPA AS $1 \times (10^{-4})$ TO $1 \times (10^{-6})$. UPON IMPLEMENTATION OF THE SELECTED REMEDY, THE RISK OF CANCER DUE TO ARSENIC EXPOSURE IS REDUCED TO AN ACCEPTABLE $2.6 \times (10^{-5})$. THE TARGET GOAL OF (10^{-6}) PREFERRED BY CERCLA CANNOT BE ACHIEVED AT THIS SITE DUE TO HIGH BACKGROUND LEVELS OF ARSENIC IN THE LOCAL SOILS, BUT NONETHELESS, THE REMEDY DOES REDUCE CARCINOGENIC RISKS TO WITHIN THE ACCEPTABLE RISK RANGE.

THE NON-CARCINOGENIC EFFECTS OF CONTAMINANTS ARE EXPRESSED IN TERMS OF CHRONIC DAILY INTAKE/REFERENCE DOSE. IF THIS RATIO EXCEEDS 1, ADVERSE EFFECTS MAY BE FOUND DUE TO THIS EXPOSURE. THE VALUES FOR THIS RATIO AS IT APPLIES TO ARSENIC ARE GIVEN IN TABLE 4. FOR THE CURRENT CONDITION, THE RATIO IS 2, OR TWICE THE SAFE AMOUNT. THE LARGEST EXPOSURE ROUTE IS INGESTION OF HOUSEHOLD DUST. AFTER IMPLEMENTATION OF THE SELECTED REMEDY, THE RATIO WILL BE REDUCED TO 0.44, WELL WITHIN THE SAFE EXPOSURE LEVEL.

THE SELECTED REMEDY THEREFORE MEETS THE THREE GOALS FOR HUMAN HEALTH CONCERNS: (1) IT WILL REDUCE THE BLOOD LEAD LEVEL FOR MOST CHILDREN TO 10 UG/DL OR LESS; (2) IT REDUCES THE RISK OF CANCER DUE TO ARSENIC EXPOSURE TO 2.6 X (10⁻⁵), WITHIN THE ACCEPTABLE RISK RANGE; AND (3) IT REDUCES THE CHRONIC DAILY INTAKE/REFERENCE DOSE FOR ARSENIC TO 0.44, A VALUE BELOW THE EPA GOAL OF 1.

SHORT-TERM EFFECTS WILL BE MINIMIZED DURING REMEDIATION BECAUSE, DURING THE EXCAVATION PROCESS, THE RESIDENTS WILL BE TEMPORARILY RELOCATED IF NECESSARY AND FUGITIVE DUST CONTROLS DURING CONTAMINATED SOIL TRANSPORT WILL BE IMPLEMENTED. THEREFORE, THERE WILL BE NO UNACCEPTABLE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS CAUSED BY IMPLEMENTATION OF THE SELECTED REMEDY.

ENVIRONMENTAL RISKS

A. SUMMARY OF EFFECTS ON A CRITICAL HABITAT

NO CRITICAL OR NON-CRITICAL WILDLIFE HABITATS, AQUATIC OR TERRESTRIAL, ARE KNOWN TO EXIST ON OU2. THE WETLANDS IN THE SOUTHEAST PORTION OF OU1, THE MILL TAILINGS SITE, WILL BE ADDRESSED IN THE PROPOSED PLAN AND ROD FOR OU1.

B. EFFECTS ON ENDANGERED SPECIES

NO ENDANGERED SPECIES ARE KNOWN TO RESIDE ON OR FREQUENT THE RESIDENTIAL/COMMERCIAL AREAS IN MIDVALE (OU2). WILDLIFE SPECIES IN OU1 WILL BE ADDRESSED IN THE PROPOSED PLAN AND ROD FOR THAT OPERABLE UNIT.

DESCRIPTION OF ALTERNATIVES

FIVE REMEDIAL ALTERNATIVES WERE EVALUATED IN THE OU2 FS. EACH IS DESCRIBED BRIEFLY.

A. NO ACTION ALTERNATIVE (ALTERNATIVE 1)

THIS ALTERNATIVE SIMPLY ALLOWS THE CONTAMINATED SOIL IN THE RESIDENTIAL AREAS OF OU2 TO REMAIN IN PLACE. HOWEVER, BECAUSE THE CONTAMINATION WOULD REMAIN, IT WOULD BE NECESSARY TO MONITOR THE SOIL AND GROUND WATER IN THIS AREA.

B. CONTAINMENT ALTERNATIVE (ALTERNATIVE 2)

THIS ALTERNATIVE PROPOSES TO INSTALL A NATIVE SOIL BARRIER OVER THE CONTAMINATED SOIL. A SUBSTANTIAL PHYSICAL BARRIER WOULD BE REQUIRED TO PREVENT UPWARD MIGRATION OF THE CONTAMINATION AS THE RESULT OF BARRIER WEATHERING AND PREVENT DOWNWARD MIGRATION TO GROUND WATER. YET THE BARRIER HAS TO BE THIN ENOUGH TO AVOID EXTENSIVE RECONSTRUCTION OF HOMES AND YARDS. THE PROPOSED CAP WOULD CONSIST OF A GEOTEXTILE BARRIER, SIX INCHES OF CLAY-LIKE NATIVE SOIL TOPPED BY SIX INCHES OF NATIVE SOIL. THIS WOULD ADD ABOUT ONE FOOT OF ELEVATION TO THE YARDS AND LAWNS AND REQUIRE RECONSTRUCTION OF SIDEWALKS AND DRIVEWAYS.

C. REMOVAL ALTERNATIVE (ALTERNATIVES 3A, 3B, AND 3C)

THIS ALTERNATIVE PROPOSES TO REMOVE THE CONTAMINATED SOIL IN SIX INCH DEPTH CONTOURS TO THE ACTION LEVEL DEPENDING ON THE DEPTH OF CONTAMINATION FOUND AT EACH PROPERTY. BASED ON THE INFORMATION GATHERED DURING THE REMEDIAL INVESTIGATION, THE MAXIMUM DEPTH OF EXCAVATION IS NOT EXPECTED TO EXCEED 24 INCHES. DURING EXCAVATION AND TRANSPORTATION, DUST CONTROL MEASURES WILL BE IMPLEMENTED. CLEAN FILL WITH NATIVE SOIL WILL REPLACE THE REMOVED SOILS TO THE ORIGINAL SURFACE, AND THE LAWNS WILL BE REVEGETATED. SIDEWALKS AND PAVED DRIVEWAYS WILL NOT BE REMOVED. THERE WERE SEVERAL OPTIONS EXPLORED FOR THE DISPOSAL OF THE REMOVED CONTAMINATION: (3A) DISPOSAL IN A RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) LANDFILL (IF THE WASTE IS CLASSIFIED AS A RCRA HAZARDOUS WASTE); (3B) DISPOSAL IN A NEWLY CREATED DISPOSAL CELL WITH OTHER MINING WASTES (IF THE WASTE IS A RCRA NON-HAZARDOUS INDUSTRIAL WASTE); OR (3C) TEMPORARY REMOVAL TO OU1, WHERE IT WILL BE REMEDIATED AS PART OF OU1. INSTITUTIONAL CONTROLS WOULD BE REQUIRED TO REGULATE REMOVAL OR REPLACEMENT OF FOUNDATIONS AND PAVED AREAS AND RELOCATION OR INITIATION OF NEW GARDENS.

D. IN SITU STABILIZATION ALTERNATIVE (ALTERNATIVE 4)

THIS OPTION PROPOSES TO REMOVE THE VEGETATION, ADD STABILIZATION AGENTS TO THE SOIL, COVER THE SOIL WITH A GEOTEXTILE FABRIC, WHICH IS IN TURN COVERED WITH FOUR INCHES OF NATIVE SOIL AND REVEGETATED. EXISTING

STRUCTURES, TREES, AND SHRUBS COULD BE PRESERVED. SEVERAL STABILIZATION AGENTS WERE CONSIDERED: (1) CEMENT-BASED; (2) POZZOLANIC-BASED; AND (3) ORGANIC POLYMER-BASED. DEPENDING ON VOLUME INCREASES, SIDEWALKS AND DRIVEWAYS MAY REQUIRE RECONSTRUCTION.

E. SOIL WASHING ALTERNATIVE (ALTERNATIVE 5)

THIS OPTION PROPOSES TO REMOVE THE VEGETATION, EXCAVATE THE CONTAMINATED SOIL, WASH THE CONTAMINATED SOIL TO REMOVE THE CONTAMINANTS, REPLACE THE EXCAVATED AREAS WITH CLEAN FILL, AND REVEGETATE. BECAUSE EVEN AFTER WASHING, THE TREATED SOIL IS LIKELY TO CONTAIN CONTAMINANTS ABOVE THE BACKGROUND LEVEL, DISPOSAL OF THE TREATED SOILS AWAY FROM THE RESIDENTS AND DISPOSAL OF THE SLUDGES PRODUCED BY SOIL WASHING WILL BE NECESSARY.

EACH OF THE ACTION ALTERNATIVES MAY REQUIRE RESIDENT RELOCATION, REMOVAL OF INTERIOR DUSTS, REFUSE REMOVAL, GARDEN REPLACEMENT, INSTITUTIONAL CONTROLS, AND GROUND WATER MONITORING. A SUMMARY OF THE VOLUMES OF CONTAMINATION TO BE LEFT IN PLACE, AND DISPOSED OF FOR EACH ALTERNATIVE IS GIVEN IN TABLE 5.

A SUMMARY OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF VARIOUS FEDERAL AND STATE LAWS AND REGULATIONS (ARARS) FOR EACH ALTERNATIVE IS GIVEN IN TABLE 6.

THE ARARS AFFECTING OU2 ALTERNATIVES INCLUDE THE FOLLOWING:

1. THE FEDERAL CLEAN AIR ACT: - TO MEET AMBIENT AIR QUALITY STANDARDS, IT WILL BE NECESSARY TO CONTROL FUGITIVE DUST DURING EXCAVATION AND TRANSPORT. THE UTAH AIR CONSERVATION ACT: - REQUIRES CONTROL OF FUGITIVE DUST DURING CONSTRUCTION OPERATIONS.
2. THE NATIONAL ARCHAEOLOGICAL AND HISTORIC PRESERVATION ACT AND THE NATIONAL HISTORIC PRESERVATION ACT BOTH REQUIRE THAT CONSTRUCTION NEAR HISTORIC STRUCTURES MINIMIZE DAMAGE TO THOSE STRUCTURES TO THE MAXIMUM EXTENT PRACTICABLE AND BE DONE IN CONSULTATION WITH THE STATE HISTORICAL COMMISSION. THERE ARE 35 SITES OF HISTORIC SIGNIFICANCE IN MIDVALE, ONE OF WHICH IS ON THE NATIONAL REGISTER OF HISTORIC PLACES. THESE STRUCTURES WILL RECEIVE SPECIAL ATTENTION DURING REMEDIAL CONSTRUCTION.
3. THE SOLID WASTE DISPOSAL ACT TRANSPORTATION PROVISIONS AND THE DOT HAZARDOUS WASTE TRANSPORTATION ACT PROVIDE REQUIREMENTS FOR TRANSPORTATION OF SOLID WASTES AND HAZARDOUS WASTE.
4. THE SURFACE MINING CONTROL ACT GIVES RELEVANT AND APPROPRIATE GUIDANCE ON REVEGETATION OF MINING, MILLING, AND WASTE PILE SITES.
5. THE NATIONAL AND UTAH OCCUPATIONAL HEALTH AND SAFETY ACTS PROVIDE APPLICABLE REQUIREMENTS FOR SAFETY PROCEDURES TO BE USED IN EXCAVATION OPERATIONS.

IF THE CONTAMINATED SOILS ARE TRANSPORTED TO ANOTHER LOCATION, SEVERAL OTHER REGULATIONS WILL BE ARARS:

1. THE NATIONAL SAFE DRINKING WATER ACT, AND THE UTAH SAFE DRINKING WATER ACT GIVE STANDARDS FOR DRINKING WATER SUPPLIES AND GROUND WATER. BECAUSE THE DRINKING WATER STANDARDS APPLY TO PUBLIC DRINKING WATER AT THE TAP, THESE REGULATIONS ARE NOT APPLICABLE BUT ARE RELEVANT AND APPROPRIATE. THE UTAH GROUND WATER PROTECTION RULES HAVE ANTIDegradation PROVISIONS WHICH REQUIRE ISOLATION OF THE WASTE FROM ENTERING THE GROUND WATER. GIVEN THE POTENTIAL MOBILITY OF ARSENIC AND LEAD IN THESE WASTES, THESE REGULATIONS ARE APPLICABLE AT OU1.
2. THE UTAH WATER QUALITY STANDARDS ARE APPLICABLE TO PLACEMENT OF OU2 SOILS AT OU1 SINCE OU1 IS LOCATED ON THE JORDAN RIVER. THE STANDARDS APPLY TO BOTH POINT SOURCES AND NON-POINT SOURCES. THEREFORE, SURFACE RUNOFF FROM THE SOILS WILL BE CONTROLLED THROUGH INSTALLATION OF A PLASTIC LINER UNDER AND OVER THE SOILS PRIOR TO REMEDIATION.
3. THE FEDERAL CLEAN AIR ACT AND UTAH AIR CONSERVATION ACT REQUIRE FUGITIVE DUST CONTROL TO MEET AMBIENT AIR STANDARDS AT OU1.
4. THE ARCHAEOLOGICAL AND HISTORIC PRESERVATION ACT AND NATIONAL HISTORIC PRESERVATION ACT APPLY TO OU1 AS WELL SINCE THE MILL BUILDING HAS BEEN DESIGNATED AS A HISTORICALLY SIGNIFICANT LANDMARK.
5. THE EXECUTIVE ORDERS ON FLOODPLAINS AND PROTECTION OF WETLANDS, THE DREDGE AND FILL REQUIREMENTS OF THE CLEAN WATER ACT, THE UTAH WATER POLLUTION CONTROL ACT, THE UTAH WASTE WATER DISPOSAL REGULATIONS, THE UTAH WATER COURSE STATUTES, AND THE UTAH WILDLIFE PROTECTION ACT APPLY TO OU1 IN THE SENSE THAT THEY LIMIT PLACEMENT OF SOILS IN THE WETLANDS, IN RIVERS, AND PROHIBIT FILLING THAT WOULD CHANGE THE COURSE OF RIVERS, OR POLLUTE HABITAT FOR AQUATIC WILDLIFE.
6. THE NATIONAL SOLID WASTE DISPOSAL ACT (MORE COMMONLY REFERRED TO AS RCRA) AND THE UTAH SOLID AND HAZARDOUS WASTE MANAGEMENT ACT BOTH HAVE RELEVANT AND APPROPRIATE REQUIREMENTS WITH REGARD TO STORAGE OF WASTES.

THEY ARE USUALLY NOT STRICTLY APPLICABLE TO THIS SITE SINCE MINING WASTES ARE, BY STATUTE, EXEMPT FROM FULL COMPLIANCE WITH THESE STATUTES.

7. STATE AND FEDERAL OSHA AND TRANSPORTATION REQUIREMENTS APPLY TO ACTIVITIES DURING PLACEMENT AT OUI.

8. THE FISH AND WILDLIFE COORDINATION ACT AND ENDANGERED SPECIES ACT ARE APPLICABLE AT OUI SHOULD WILDLIFE AND FISHERIES BE IMPACTED.

PERHAPS THE MOST IMPORTANT OF THE FEDERAL GUIDANCE IS CLASSIFIED AS "TO BE CONSIDERED (TBC)". IT IS THE GUIDANCE FROM THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) WHICH RECOMMENDS THAT THE LEAD IN CHILDREN 0-3 YEARS OF AGE SHOULD NOT EXCEED 10-15 UG/DL. RECENT EPA GUIDANCE, AS DISCUSSED EARLIER, RECOMMENDS THAT THE LOWER VALUE OF THIS TARGET RANGE BE USED. THEREFORE THE 10 UG/DL BLOOD LEAD LEVEL GOAL WAS USED TO CALCULATE THE ACTION LIMITS ON WHICH ALL THE ALTERNATIVES WERE BASED. ALTERNATIVES WHICH WOULD NOT ACHIEVE THIS GOAL WERE ELIMINATED FROM CONSIDERATION. IN ORDER TO ACHIEVE ARARS RELATING TO TEMPORARY PLACEMENT OF CONTAMINATED RESIDENTIAL SOILS AT THE MILL SITE (OUI) IT WILL BE NECESSARY TO PLACE THE SOILS ON A PLASTIC LINER AND COVER THEM WITH ANOTHER PLASTIC LINER TO PREVENT FUGITIVE DUST, STORM WATER RUNOFF CONTAMINATION AND GROUND WATER CONTAMINATION. THE SOILS WILL NOT BE PLACED IN THE WETLANDS OF OUI NOR WILL THEY BE PLACED IN THE RIVER OR IN WILDLIFE HABITATS. BEFORE EXCAVATION AROUND THE HISTORIC SITES, THE STATE HISTORICAL COMMISSION WILL BE CONTACTED. TOXIC SUBSTANCES CONTROL ACT (TSCA) REGULATIONS WILL BE FOLLOWED IF ASBESTOS OR PCBS ARE FOUND IN THE PROCESS OF EXCAVATION.

#SCAA

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE (NCP) REQUIRES THAT EACH ALTERNATIVE BE EVALUATED IN TERMS OF NINE CRITERIA WHICH ARE DIVIDED INTO THREE CATEGORIES.

THE FIRST CATEGORY IS THRESHOLD CRITERIA:

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT; AND
2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

THE SECOND CATEGORY IS THE PRIMARY BALANCING CRITERIA:

3. LONG TERM EFFECTIVENESS AND PERMANENCE;
4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT;
5. SHORT TERM EFFECTIVENESS;
6. IMPLEMENTABILITY;
7. COSTS.

THE THIRD CATEGORY IS MODIFYING CRITERIA:

8. STATE ACCEPTANCE;
9. COMMUNITY ACCEPTANCE.

AN EVALUATION OF EACH ALTERNATIVE WITH REGARD TO THESE CRITERIA IS DESCRIBED IN TABLE 7, AND SUMMARIZED IN THE FOLLOWING SECTION.

CRITERION 1: OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THIS CRITERION ADDRESSES WHETHER A REMEDY PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS POSED THROUGH EACH PATHWAY ARE ELIMINATED, REDUCED, OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS. ALTERNATIVE 1, THE "NO ACTION ALTERNATIVE" DOES NOTHING TO REDUCE EXPOSURES. ALTERNATIVES 2 - 5 REDUCE EXPOSURE BY REDUCING THE LIKELIHOOD OF DIRECT CONTACT WITH THE CONTAMINATION. IN ADDITION, ALTERNATIVES 3 AND 5 ELIMINATE THE POTENTIAL EXPOSURE BY TAKING THE BULK OF THE CONTAMINATION COMPLETELY AWAY FROM THE SITE.

CRITERION 2: COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

THIS CRITERION ADDRESSES WHETHER A REMEDY WILL MEET ALL OF THE ARARS OF OTHER FEDERAL AND STATE ENVIRONMENTAL LAWS. ALTERNATIVE 1, THE "NO ACTION" ALTERNATIVE DOES NOT MEET AIR OR WATER RELEASE STANDARDS. ALL OF THE OTHER ALTERNATIVES (2 - 5) WOULD MEET ALL ARARS.

CRITERION 3: LONG-TERM EFFECTIVENESS AND PERMANENCE

THIS CRITERION REFERS TO EXPECTED RESIDUAL RISK AND THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEAN UP GOALS HAVE BEEN MET. ALTERNATIVE 1, THE "NO ACTION" ALTERNATIVE DOES NOTHING TO BE PROTECTIVE LONG-TERM OR SHORT-TERM. ALTERNATIVES 2 AND 4 LEAVE WASTES IN PLACE AND RELY ON INSTITUTIONAL CONTROLS FOR LONG-TERM EFFECTIVENESS. SINCE IN ALTERNATIVES 3 AND 5 THE CONTAMINATED SOILS HAVE BEEN REMOVED, THERE IS LESS RELIANCE ON INSTITUTIONAL CONTROLS, ALTHOUGH THEY WILL BE USED JUST IN THE CASE THAT CONTAMINATION IS PRESENT UNDER PAVED AREAS SUCH AS SIDEWALKS, DRIVEWAYS, AND FOUNDATIONS, AND DURING THE RELOCATION OR INITIATION OF GARDENS.

CRITERION 4: REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

THIS IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES A REMEDY MAY EMPLOY. ALTHOUGH CONTAINMENT OPTIONS DO REDUCE MOBILITY, THIS IS NOT "TREATMENT" IN THE CONTEXT OF THIS CRITERION. THIS CRITERION REFLECTS THE STATUTORY PREFERENCE FOR TREATMENT ALTERNATIVES. ONLY TWO OF THE ALTERNATIVES CLASSIFY AS TREATMENT: ALTERNATIVE 4 (STABILIZATION) AND ALTERNATIVE 5 (SOIL WASHING). ALTERNATIVE 4'S TREATMENT WOULD DECREASE TOXICITY AND MOBILITY BUT INCREASE VOLUME. ALTERNATIVE 5'S TREATMENT WOULD REDUCE TOXICITY, MOBILITY, AND VOLUME. ALTERNATIVE 3C MAY MEET THIS CRITERION IF SOILS STORED AT OUL RECEIVE TREATMENT IN THE FUTURE.

CRITERION 5: SHORT-TERM EFFECTIVENESS

THIS CRITERION ADDRESSES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD, UNTIL CLEAN UP GOALS ARE ACHIEVED. BECAUSE THERE IS NO CONSTRUCTION REQUIRED IN ALTERNATIVE 1, THE "NO ACTION" ALTERNATIVE, THERE WOULD BE NO RISKS IN ADDITION TO THOSE ALREADY PRESENT. ALTERNATIVE 2 DOES NOT REQUIRE ANY MOVEMENT OR TRANSPORT OF CONTAMINATED SOILS, THEREFORE, FUGITIVE DUST FROM THIS SOURCE WILL BE MINIMAL. ALTERNATIVES 3 THROUGH 5 ALL REQUIRE MOVEMENT OF CONTAMINATED SOIL, SO THERE IS SOME THREAT OF EXPOSURE VIA FUGITIVE DUST EMISSIONS. EXPOSURE VIA FUGITIVE DUST WILL BE MINIMIZED FOR ALL THESE ALTERNATIVE BY TEMPORARY RELOCATION OF THE RESIDENTS DURING CONSTRUCTION, AND BY USE OF DUST SUPPRESSION METHODS.

CRITERION 6: IMPLEMENTABILITY

IMPLEMENTABILITY ADDRESSES THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF THE REMEDY, INCLUDING AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT A PARTICULAR OPTION. BECAUSE ALTERNATIVE 1 REQUIRES NO ACTION, IT IS EASILY IMPLEMENTED. ALTERNATIVES 2 THROUGH 5 USE TECHNOLOGIES AND CONSTRUCTION THAT ARE READILY AVAILABLE. ALTERNATIVES 3 AND 5 REQUIRE DISPOSAL SITES AND THEREFORE POSE MORE DIFFICULTY, BUT NONETHELESS DISPOSAL CAPACITY IS AVAILABLE. ALTERNATIVES 3 AND 4 REQUIRE MODERATE COORDINATION WITH LOCAL OFFICIALS AND ALTERNATIVE 5 REQUIRES A HIGH DEGREE OF COORDINATION BECAUSE OF THE PRODUCTION OF SOIL WASHING EFFLUENTS WHICH WILL REQUIRE DISPOSAL.

CRITERION 7: COSTS

COST FACTORS INCLUDE ESTIMATED CAPITAL AND OPERATION AND MAINTENANCE (O&M) COSTS, AS WELL AS PRESENT WORTH COSTS. ALTERNATIVE 1, THE "NO ACTION" ALTERNATIVE HAS LITTLE CAPITAL COSTS BUT DOES REQUIRE MONITORING AND THEREFORE O&M EXPENDITURES. IT IS OBVIOUSLY THE LEAST COSTLY ALTERNATIVE. ALTERNATIVES 2,3C, AND 4 HAVE MODERATE COSTS IN THE \$20 MILLION RANGE. ALTERNATIVES 3A, 3B, AND 5 HAVE SUBSTANTIALLY HIGHER COSTS (\$70 - 90 MILLION).

CRITERION 8: STATE ACCEPTANCE

THIS CRITERION INDICATES THE STATE'S PREFERENCES REGARDING THE VARIOUS ALTERNATIVES. THE STATE OF UTAH SUPPORTS ALTERNATIVE 3C AS EVIDENCED BY ITS TESTIMONY AT VARIOUS PUBLIC MEETINGS, AND ITS WRITTEN SUBMITTAL DURING THE COMMENT PERIOD.

CRITERION 9: COMMUNITY ACCEPTANCE

THIS CRITERION ADDRESSES THE PUBLIC'S GENERAL RESPONSE TO THE ALTERNATIVES DESCRIBED IN THE PROPOSED PLAN. MOST OF THE RESIDENTS INTERVIEWED AND LOCAL POLITICAL OFFICIALS SUPPORTED ALTERNATIVE 3C.

OF THE VARIOUS ALTERNATIVES PROPOSED, ALTERNATIVE 3C WAS THE BEST OVERALL IN SATISFYING THE NINE REMEDY SELECTION CRITERIA OF THE NCP.

#SR

THE SELECTED REMEDY

EPA HAS CHOSEN ALTERNATIVE 3C AS THE SELECTED REMEDY (ILLUSTRATED IN FIGURE 3) FOR THE SHARON STEEL OPERABLE UNIT O2. IN SUMMARY, THIS ALTERNATIVE HAS THE FOLLOWING COMPONENTS:

- A. SOILS ON EACH PROPERTY WILL BE TESTED PRIOR TO ANY ACTION.
- B. IF TESTING OF THE HAZARDS ASSOCIATED WITH CONSTRUCTION AT A VACANT CONTAMINATED LOT IN MIDVALE SHOWS THAT RELOCATION IS ADVISED, BECAUSE THE NATIONAL AIR QUALITY STANDARDS MAY BE VIOLATED, RESIDENTS WILL BE OFFERED RELOCATION DURING CONSTRUCTION ACTIVITIES.
- C. REMOVAL OF CONTAMINATED HOUSEHOLD DUST FROM RESIDENCES WHEN LEAD CONCENTRATIONS IN THE DUST ARE ABOVE 500 PPM LEAD USING FIELD ANALYSIS.
- D. REMOVAL OF EXISTING GARDEN SOILS DOWN TO 18 INCHES FOR SOILS WITH CONCENTRATIONS OF LEAD GREATER THAN 200 PPM AND ARSENIC GREATER THAN 70 PPM. INSTITUTIONAL CONTROLS WILL BE EMPLOYED TO REGULATE THE INSTALLATION OF NEW GARDENS.
- E. REMOVAL OF CONTAMINATED SOILS, NOT COVERED BY PAVEMENT OR STRUCTURES, CONTAINING CONCENTRATIONS GREATER THAN 500 PPM PB AND 70 PPM AS. THE DEPTH OF EXCAVATION, BASED ON DATA GATHERED DURING THE OU2 RI IS NOT EXPECTED TO EXCEED 24 INCHES.
- F. REPLACEMENT OF EXCAVATED AREAS WITH CLEAN FILL UP TO THE ORIGINAL GRADE.
- G. REVEGETATION TO INITIAL CONDITIONS.
- H. TEMPORARY STORAGE OF CONTAMINATED SOILS AT OU1, SEPARATE FROM THE TAILINGS AND WHERE THEY WILL BE INCLUDED IN THE FINAL REMEDY FOR OU1.
- I. INSTALLATION OF A PLASTIC LINER UNDER AND OVER THE EXCAVATED SOIL WHICH WILL BE STORED AT OU1. THIS LINER WILL PREVENT REDISPERAL OF THE SOILS BEFORE REMEDIATION OF OU1.
- J. INSTITUTIONAL CONTROLS TO REQUIRE BUILDING PERMITS PRIOR TO CONSTRUCTION DURING REMOVAL OR REPLACEMENT OF PAVEMENTS OR FOUNDATIONS. SUCH ACTIVITIES MAY EXPOSE CONTAMINATED SOILS LEFT IN PLACE BY REMEDIATION AND SUCH ACTIVITIES WILL REQUIRE SPECIAL PRECAUTIONS. A "CITIZENS REPOSITORY" MAY BE CREATED TO PROVIDE A PLACE FOR RESIDENTS TO DISPOSE OF SOILS DURING THESE FUTURE ACTIVITIES.
- K. DETAILED DESCRIPTIONS OF INSTITUTIONAL CONTROLS WILL BE PRODUCED DURING RD, AND THEY WILL BE ENACTED BY THE APPROPRIATE LOCAL GOVERNMENTS PRIOR TO IMPLEMENTATION OF RA.

THE OBJECTIVE OF THE SELECTED REMEDY IS REDUCTION OF EXPOSURE OF THE RESIDENTS OF MIDVALE TO THE UNACCEPTABLY HIGH LEVELS OF LEAD AND ARSENIC IN THEIR SOILS. THE ACTION LEVELS BASED ON HEALTH-BASED CALCULATIONS ARE 500 PPM LEAD AND 70 PPM ARSENIC FOR SOILS. BECAUSE HOME GROWN VEGETABLES GROWN IN CONTAMINATED SOIL CAN INCORPORATE LEAD AND THEREBY PRODUCE AN ADDITIONAL EXPOSURE ROUTE, THE ACTION LEVEL FOR GARDEN SOILS IS 200 PPM LEAD AND 70 PPM ARSENIC. WHEN THIS REMEDY IS IMPLEMENTED, THE RISKS FROM CANCER DUE TO ARSENIC EXPOSURE WILL BE REDUCED FROM CURRENT RISKS OF $5 \times (10^{-4})$ TO $2.6 \times (10^{-5})$, THE CURRENT HAZARD INDEX DUE TO ARSENIC EXPOSURE WILL BE REDUCED FROM 2 TO 0.44. THE PERCENTAGE OF CHILDREN PREDICTED TO HAVE BLOOD LEAD LEVELS IN EXCESS OF 10 UG/DL WILL BE REDUCED FROM 85 PERCENT TO APPROXIMATELY 11 PERCENT IN AREAS OF GREATEST CONTAMINATION. IN AREAS OF INTERMEDIATE CONTAMINATION, THE PERCENTAGE WILL BE REDUCED FROM 36 PERCENT TO 11 PERCENT.

#SD

STATUTORY DETERMINATIONS

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

THE SELECTED REMEDY MEETS THE THREE GOALS FOR HUMAN HEALTH CONCERNS TO THE MAXIMUM EXTENT PRACTICABLE: (1) IT WILL REDUCE THE BLOOD LEAD LEVEL FOR MOST CHILDREN 10 UG/DL OR LESS; (2) IT REDUCES THE RISK OF CANCER DUE TO ARSENIC EXPOSURE TO $2.6 \times (10^{-5})$, WITHIN THE ACCEPTABLE RISK RANGE; AND (3) IT REDUCES THE CHRONIC DAILY INTAKE/REFERENCE DOSE FOR ARSENIC TO 0.44, A VALUE BELOW THE EPA GOAL OF 1. THE PREFERRED GOAL OF (10^{-6}) EXCESS RISK OF CANCER DUE TO ARSENIC EXPOSURE COULD NOT BE REACHED AT THIS SITE BECAUSE THE CONCENTRATION OF ARSENIC IN LOCAL BACKGROUND SOILS RESULTED IN A SLIGHTLY HIGHER RISK. NONETHELESS, THE RISK DOES FALL INTO THE ACCEPTABLE RANGE FOR ARSENIC AND MEETS THE OTHER GOALS.

IN ADDITION, SHORT-TERM EFFECTS WILL BE MINIMIZED DURING REMEDIAL ACTION BECAUSE, DURING THE EXCAVATION PROCESS, THE RESIDENTS WILL BE TEMPORARILY RELOCATED IF NECESSARY AND FUGITIVE DUST CONTROLS DURING TRANSPORT OF CONTAMINATED SOILS WILL BE IMPLEMENTED. THEREFORE, THERE WILL BE NO UNACCEPTABLE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS CAUSED BY IMPLEMENTATION OF THE SELECTED REMEDY.

COMPLIANCE WITH ARARS

THE SELECTED REMEDY WILL COMPLY WITH ALL FEDERAL AND STATE ARARS. A LIST OF ARARS FOR THE SELECTED REMEDY IS GIVEN IN TABLE 8. BECAUSE THE REMEDY INVOLVES EXCAVATION OF CONTAMINATED SOILS FROM OU2 AND PLACEMENT OF THEM INTO OU1, THE ARARS AFFECTING OU1 MUST BE CONSIDERED. WHERE UTAH IS AUTHORIZED TO IMPLEMENT FEDERAL LAW, FEDERAL STANDARDS HAVE THE FORCE OF UTAH LAW AS WELL.

COST EFFECTIVENESS

OF THE TWO REMEDIES IN WHICH THE CONTAMINATED SOILS ARE TRANSPORTED AWAY FROM THE RESIDENCES IN OU2, THE SELECTED REMEDY IS THE MOST COST EFFECTIVE WHILE STILL PROVIDING AN EQUAL LEVEL OF PROTECTIVENESS. IT ALSO COMPARES FAVORABLY WITH ALTERNATIVES WHERE THE WASTES REMAIN ON SITE.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES

OF THE FIVE ALTERNATIVES CONSIDERED, ONLY TWO MOVED THE WASTES AWAY FROM THE RESIDENCES. THE CITIZENS AND POLITICAL LEADERS OF MIDVALE PREFER THAT THE WASTE NOT BE LEFT BEHIND, BURIED, OR EVEN STABILIZED. IN ADDITION TO THE REDUCTION OF EXPOSURE RISK, THEY WERE CONCERNED THAT ANY WASTES LEFT IN THEIR NEIGHBORHOOD WOULD REDUCE PROPERTY VALUES AND IMPAIR THE CITY'S ABILITY TO ATTRACT NEW DEVELOPMENT. FURTHERMORE, EPA AND THE STATE WERE CONCERNED THAT REMEDIES RELYING ON EXTENSIVE INSTITUTIONAL CONTROLS WOULD BE INSUFFICIENT IN THE LONG TERM TO PROVIDE A LASTING SOLUTION WHEN ANY WASTE IS LEFT IN A READILY ACCESSIBLE PLACE.

OF THE TWO ALTERNATIVES WHERE THE WASTES WOULD BE REMOVED, THE SELECTED REMEDY, ALTERNATIVE 3C WAS MORE COST EFFECTIVE, BUT HAD NO SEPARATE TREATMENT. THE OTHER (ALTERNATIVE 5) EMPLOYS A TREATMENT ALTERNATIVE (SOIL WASHING) BUT IS PROHIBITIVELY EXPENSIVE, AND HARDER TO IMPLEMENT THAN THE CHOSEN ALTERNATIVE.

HOWEVER, BECAUSE THE ALTERNATIVES FOR REMEDIATION OF THE TAILINGS AT OU1 ARE STILL BEING EVALUATED, IT WAS DECIDED TO MOVE THE 242,000 CUBIC YARDS OF CONTAMINATED RESIDENTIAL SOILS TO OU1 (WHERE 14,000,000 CUBIC YARDS OF TAILINGS ALREADY EXIST) AS AN INTERIM MEASURE. THE FINAL REMEDY FOR OU1 WILL THEN ADDRESS BOTH KINDS OF WASTES. BOTH TREATMENT PROCEDURES AND REPROCESSING OPERATIONS ARE BEING CONSIDERED AS A FINAL REMEDY AT OU1. THUS, THIS IS A LIMITED SCOPE OF ACTION ADDRESSING ONLY THE REMOVAL OF SOILS FROM THE RESIDENCES. CONSOLIDATION OF SOILS INTO ONE PLACE WILL SIMPLIFY THE LATER FINAL REMEDY.

PREFERENCE OF TREATMENT AS A PRINCIPAL ELEMENT

THE CERCLA LEGISLATION STIPULATES THAT TREATMENT ALTERNATIVES ARE THE PREFERRED APPROACH TO REMEDIATION OF SUPERFUND SITES. BECAUSE THE SELECTED REMEDY FOR OU2 IS A LIMITED ACTION, IT DOES NOT INCLUDE TREATMENT AT THIS OU. INSTEAD THE CONTAMINATED SOILS WILL BE REMEDIATED ALONG WITH THE OTHER WASTES AT OU1. THE PREFERENCE FOR TREATMENT OR REPROCESSING WILL BE CONSIDERED LATER IN THAT CONTEXT. SINCE THE SOURCE OF THE CONTAMINATION IN THE OU2 SOILS WERE TAILINGS FROM OU1, THE RELATIVELY LOW VOLUME OF THESE SOILS SHOULD NOT COMPLICATE FUTURE REMEDIES.

DOCUMENTATION OF SIGNIFICANT CHANGES TO THE PROPOSED PLAN

CERCLA SECTION 117(B) REQUIRES AN EXPLANATION OF ANY SIGNIFICANT CHANGES TO THE PREFERRED ALTERNATIVE AS PRESENTED IN THE PROPOSED PLAN WHICH WAS AVAILABLE FOR PUBLIC COMMENT. THERE WERE NO SIGNIFICANT CHANGES.

RESPONSIVENESS SUMMARY

THIS COMMUNITY RELATIONS RESPONSIVENESS SUMMARY FOR THE SHARON STEEL/MIDVALE TAILINGS SITE (SHARON STEEL SITE) HAS BEEN PREPARED AS A PART OF THE DECISION-MAKING PROCESS BY THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) ON OPERABLE UNIT TWO (OU2), RESIDENTIAL SOILS. THE PURPOSE OF THIS DOCUMENT IS TO:

- HELP INFORM EPA DECISION-MAKERS ABOUT COMMENTS ON ITS PROPOSED PLAN FOR REMEDIATING CONTAMINATED RESIDENTIAL SOILS AT THE SITE AND ON OTHER ALTERNATIVES EVALUATED; AND
- PROVIDE A PUBLIC SUMMARY OF ALL COMMENTS AND RESPONSES MADE ON OU2.

THIS DOCUMENT IS DIVIDED INTO THE FOLLOWING SECTIONS:

SECTION 1. EXECUTIVE SUMMARY

THIS SECTION SUMMARIZES THE COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE SITE, THE PUBLIC'S AND OTHER REACTIONS TO THE PREFERRED AND OTHER ALTERNATIVES FOR REMEDIAL ACTION, AND EPA'S RESPONSES TO THESE COMMENTS. (PAGE 2)

SECTION 2. INTRODUCTION AND BACKGROUND

THIS SECTION PROVIDES A BRIEF INTRODUCTION TO THE SITE AND EPA'S PREFERRED AND OTHER ALTERNATIVES FOR REMEDIAL ACTION ON OU2. (PAGE 5)

SECTION 3. THE COMMUNITY RELATIONS PROGRAM AT THE SHARON STEEL SITE.

THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY RELATIONS ACTIVITIES UNDERTAKEN DURING REMEDIAL PLANNING ACTIVITIES AT THE SITE, WITH PARTICULAR EMPHASIS ON ACTIVITIES RELATED TO OU2. (PAGE 7)

SECTION 4. SUMMARY OF MAJOR COMMENTS RECEIVED AND EPA'S RESPONSES.

THIS SECTION (BEGINNING ON PAGE 10) SUMMARIZES COMMENTS RECEIVED IN THE FOLLOWING PARTS:

- PART 1. NON-TECHNICAL COMMENTS. (PAGE 12)
- PART 2. TECHNICAL COMMENTS. (PAGE 27)

IN GENERAL, THIS SECTION CATEGORIZES WRITTEN AND ORAL COMMENTS BY RELEVANT TOPICS AND INDICATES THE SOURCE OF COMMENTS IN EACH CATEGORY. SUMMARIES OF EPA'S RESPONSES TO THESE COMMENTS ARE ALSO PROVIDED.

ATTACHMENT A. COMMUNITY RELATIONS ACTIVITIES, WHICH PROVIDES A FULL LIST OF EPA'S EFFORTS TO INVOLVE THE COMMUNITY AT THE SITE. (PAGE 63)

ATTACHMENT B. IDENTIFICATION OF COMMENTS RECEIVED, WHICH INCLUDES A LIST OF ALL THE INDIVIDUALS WHOSE COMMENTS WERE RECEIVED IN WRITING OR MADE DURING THE PUBLIC MEETING ON OU2. EACH COMMENTER IS NUMBERED TO ASSIST READERS IN TRACKING SPECIFIC COMMENTS AND RESPONSES. (PAGE 67)

1.0 EXECUTIVE SUMMARY

THIS RESPONSIVENESS SUMMARY PROVIDES AN OVERVIEW OF THE COMMUNITY RELATIONS PROGRAM FOR OPERABLE UNIT 2 (OU2) AT THE SHARON STEEL/MIDVALE TAILINGS SUPERFUND SITE IN MIDVALE, UTAH UP TO THE POINT AT WHICH A REMEDIAL ALTERNATIVE WAS SELECTED. THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS THE LEAD AT THE SITE AND IS WORKING COOPERATIVELY WITH THE UTAH DEPARTMENT OF HEALTH (UDOH) TO STUDY AND REMEDIATE CONTAMINATION IN RESIDENTIAL SOILS (OU2) IN MIDVALE. THIS CONTAMINATION IS BELIEVED TO HAVE COME FROM PAST METALS MILLING IN MIDVALE.

THIS DOCUMENT COVERS THREE MAIN AREAS: 1) AN INTRODUCTION AND BACKGROUND, INCLUDING A LIST OF REMEDIAL ALTERNATIVES EVALUATED; 2) HIGHLIGHTS OF THE COMMUNITY RELATIONS PROGRAM; AND 3) A SUMMARY OF COMMENTS ON EPA'S PREFERRED AND OTHER ALTERNATIVES FOR REMEDIATING RESIDENTIAL SOILS, AND EPA'S RESPONSES TO THOSE COMMENTS.

INTRODUCTION AND BACKGROUND

EPA DEVELOPED FIVE ALTERNATIVES TO ADDRESS CONTAMINATION IN RESIDENTIAL SOILS. THOSE FIVE WERE:

- NO ACTION
- CAPPING WITH NATIVE SOIL
- EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL TO THE MILL SITE
- IN-PLACE STABILIZATION OF CONTAMINATED SOILS
- EXCAVATION OF CONTAMINATED SOIL WITH TREATMENT PRIOR TO DISPOSAL

EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL TO THE MILL SITE WAS PRESENTED AS EPA'S PREFERRED ALTERNATIVE.

COMMUNITY RELATIONS

COMMUNITY RELATIONS ACTIVITIES AT THE SHARON STEEL/MIDVALE TAILINGS SITE BEGAN EARLY IN 1982 IN RESPONSE TO INDICATIONS THAT POTENTIALLY HAZARDOUS MILL SITE TAILINGS WERE BEING USED IN GARDENS, SANDBOXES, AND LANDSCAPING IN NEARBY HOMES. INITIAL COMMUNITY RELATIONS ACTIVITIES FOCUSED ON PRESS RELEASE WARNINGS FROM UDOH, WHICH ADVISED AGAINST CONTINUED USE OF THE TAILINGS AND ANNOUNCED THE POTENTIAL LISTING OF THE SITE ON THE SUPERFUND NATIONAL PRIORITIES LIST.

THROUGHOUT THE EARLY 1980S, MIDVALE RESIDENTS RECEIVED NUMEROUS FACT SHEET MAILINGS. BY THE MID-1980S, THE ACTIVITIES ESCALATED WITH A MORE AGGRESSIVE CAMPAIGN OF SIGN POSTING, AN EPIDEMIOLOGICAL SURVEY, ESTABLISHMENT OF INFORMATION REPOSITORIES, INTERVIEWS OF RESIDENTS, AND UPDATED FACT SHEETS. BY 1987, EPA WAS ACTIVELY INVOLVED WITH THE MIDVALE COMMUNITY LIAISON COUNCIL MADE UP OF RESIDENTS AND STATE AGENCY REPRESENTATIVES. EPA PREPARED A COMMUNITY RELATIONS PLAN THE FOLLOWING YEAR, WHICH OUTLINED COMMUNITY CONCERNS AND A STRATEGY FOR COMMUNITY NOTIFICATION AND INVOLVEMENT.

BY MID-1989, ACTIVITIES INCREASED WITH EXTENSIVE PUBLIC MEETINGS, ADVERTISING, A PUBLIC COMMENT PERIOD, A PROPOSED PLAN FOR REMEDIATING TAILINGS, AND COOPERATIVE ACTIVITIES AMONG EPA, THE STATE, AND LOCAL GOVERNMENT. IN LATE 1989, IN RESPONSE TO COMMENTS FROM THE STATE AND THE COMMUNITY, EPA ANNOUNCED THE IDENTIFICATION OF A SECOND OPERABLE UNIT -- OPERABLE UNIT TWO, RESIDENTIAL SOILS -- WHICH EXPANDED THE SITE TO INCLUDE RESIDENTIAL SOILS, AS WELL AS TAILINGS ON THE MILL SITE. CONCURRENT WITH THIS ANNOUNCEMENT, EPA INCREASED COMMUNITY RELATIONS EFFORTS IN ITS INTERACTIONS WITH THE STATE AND LOCAL OFFICIALS, LOCAL MEDIA REPRESENTATIVES, THE PUBLIC, AND POTENTIAL REPROCESSORS. EPA AND THE STATE OF UTAH FORMED A TECHNICAL ADVISORY COMMITTEE TO PROVIDE AN INTERACTIVE FORUM FOR KEY PARTIES INVOLVED WITH THE TECHNICAL STUDIES, INCLUDING REPRESENTATIVES FROM EPA UDOH, THE SALT LAKE COUNTY HEALTH DEPARTMENT, THE POTENTIALLY RESPONSIBLE PARTIES (PRPS), THE MIDVALE CITY GOVERNMENT, THE US GEOLOGICAL SURVEY, AND THE US BUREAU OF RECLAMATION. EPA FOLLOWED UP RESIDENTIAL SOIL SAMPLING WITH 1) LETTERS THAT PROVIDED RESIDENTS WITH ANALYTICAL RESULTS, AND 2) A QUESTION AND ANSWER SESSION TO ASSIST RESIDENTS IN UNDERSTANDING THE RESULTS AND TO RESPOND TO THEIR CONCERNS. EPA AND THE STATE ALSO HELD A SERIES OF PUBLIC FORUMS AND DISTRIBUTED THE REMEDIAL INVESTIGATION (RI) ADDENDUM AND THE FEASIBILITY STUDY (FS) REPORT FOR OU2 TO THE INFORMATION REPOSITORIES. IN JULY, 1990, EPA AGREED TO EXTEND THE PUBLIC COMMENT PERIOD AT THE REQUEST OF THE PRPS AND CONTINUED TO MEET WITH CONGRESSIONAL AIDES AND THE MAYORS OF MIDVALE AND NEIGHBORING WEST JORDAN.

IN SUMMARY, THE INCREASE IN COMMUNITY RELATIONS ACTIVITIES AND THE ADDITION OF A SECOND OPERABLE UNIT WERE DIRECT RESPONSES TO PUBLIC COMMENT. EPA AND THE STATE OF UTAH HAVE SPENT THE LAST TWO YEARS WORKING CLOSELY WITH MIDVALE RESIDENTS IN A COOPERATIVE EFFORT TOWARD REMEDIATION.

COMMENTS AND RESPONSES

EPA HELD A PUBLIC COMMENT PERIOD AND A PUBLIC MEETING ON OU2, SOLICITING COMMENTS ON ITS PROPOSED PLAN, THE FEASIBILITY STUDY (FS) REPORT, AND THE RI ADDENDUM. ABOUT 24 PERSONS COMMENTED, REPRESENTING THE STATE, LOCAL GOVERNMENT, ENVIRONMENTAL ORGANIZATIONS, PRIVATE CITIZENS, AND THE PRPS. MOST COMMENTERS WERE GENERALLY POSITIVE TOWARD EPA'S PROPOSED PLAN. THE PRPS, HOWEVER, CRITICIZED EPA'S PREMISES, METHODS, AND CONCLUSIONS. COMMENTS AND RESPONSES ARE ORGANIZED INTO TWO CATEGORIES: NON-TECHNICAL AND TECHNICAL COMMENTS.

NON-TECHNICAL COMMENTS FOCUSED ON ADEQUACY OF STUDIES, APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS), SOILS CONCERNS, IMPLEMENTATION ISSUES, COST ISSUES, AND ECONOMICS. A NUMBER OF COMMENTS COULD NOT BE ANSWERED AT THIS TIME, BECAUSE THEY ADDRESSED OU1, WERE QUESTIONS THAT WOULD BE ADDRESSED DURING REMEDIAL DESIGN OR REQUIRED MORE STUDY. THESE QUESTIONS ARE PRESENTED AS "REMAINING ISSUES." THE FOLLOWING THREE ISSUES WERE MENTIONED MOST FREQUENTLY IN THE NON-TECHNICAL COMMENTS:

- TEMPORARY STORAGE OF RESIDENTIAL SOILS AT THE MILL SITE

THE CITY OF MIDVALE AND OTHER COMMENTERS ASKED EPA TO DECIDE HOW TO DISPOSE OF RESIDENTIAL SOILS ONLY ONCE -- AT THE SAME TIME IT DECIDES HOW TO REMEDIATE OU1 (THE MILL SITE) -- TO AVOID THE COSTS OF HANDLING RESIDENTIAL SOILS TWICE AND STORING THEM TEMPORARILY AT THE MILL SITE. EPA RESPONDED THAT WHILE IT MAY BE POSSIBLE TO ACCOMPLISH THIS DURING REMEDIAL DESIGN, THE HIGHER PRIORITY IS TO PREVENT FURTHER POTENTIAL EXPOSURE IN THE SHORT RANGE. EPA BELIEVES THAT THE COSTS WILL ACTUALLY BE DECREASED BY THIS ALTERNATIVE, SINCE THERE ARE ECONOMIES OF SCALE IN TREATMENT ON OU1.

- BLOWING DUST

THE CITY OF MIDVALE AND OTHERS EXPRESSED CONCERN THAT STORING RESIDENTIAL SOILS AT THE MILL SITE WOULD ADD TO THE PROBLEM OF BLOWING DUST AND ULTIMATELY LEAD TO A REDISTRIBUTION OF CONTAMINATION INTO RESIDENTIAL AREAS. EPA ACKNOWLEDGED THIS CONCERN AND SAID IT WILL REQUIRE THE PRPS TO CONTINUE TO COVER THE TAILINGS AND THE RESIDENTIAL SOILS STORED THERE WITH A DUST SUPPRESSANT.

- GROUND WATER

A NUMBER OF COMMENTERS EXPRESSED CONTINUING CONCERN ABOUT POTENTIAL CONTAMINATION OF AREA GROUND WATER. WHILE THE GROUND WATER INVESTIGATION IS CONTINUING AND THESE CONCERNS CANNOT BE RESOLVED COMPLETELY AT THIS TIME, EPA AGREED WITH THIS CONCERN AND SAID IT WOULD ASSURE THE PROTECTION OF THE GROUND WATER IN ITS DECISION ON OUL, WHICH WOULD BE THE SOURCE OF POTENTIAL GROUND WATER CONTAMINATION.

TECHNICAL COMMENTS, RAISED PRIMARILY BY THE PRPS, FOCUSED ON KRIGING, MODELING, GEOSTATISTICAL METHODS, STATISTICS, AND ESTIMATES OF HEALTH RISKS AND ACTION LEVELS. THE FOLLOWING ISSUES WERE MENTIONED MOST OFTEN:

- KRIGING, MODELING, AND GEOSTATISTICAL METHODS

IN GENERAL, THE PRPS CRITICIZED EPA'S CONCLUSIONS ABOUT THE LOCATION OF CONTAMINATION IN RESIDENTIAL AREAS. THE PRPS SAID THAT THE RAW DATA, THE COMPUTER MODEL, AND THE RESULTING MAPS WERE FLAWED AND DID NOT ACCURATELY REFLECT THE LEVEL OF CONTAMINATION IN RESIDENTIAL AREAS. EPA REAFFIRMED ITS CONFIDENCE IN THE METHODS IT USED TO ESTABLISH THE EXTENT AND CONCENTRATION CONTAMINATION.

- HEALTH RISKS AND ACTION LEVELS

THE PRPS WERE GENERALLY SKEPTICAL OF EPA'S CONCLUSIONS ABOUT HEALTH RISKS ASSOCIATED WITH CONTAMINATED TAILINGS IN THE MIDVALE AREA, CONTENDING THAT EPA SHOULD HAVE USED RESULTS FROM THE BLOOD-LEAD STUDY THE PRPS CONDUCTED LAST YEAR TO HELP DEVELOP ACTION LEVELS FOR LEAD. THE PRPS ALSO EXPRESSED THE OPINION FREQUENTLY THAT EPA'S ACTION LEVELS FOR LEAD AND ARSENIC ARE TOO CONSERVATIVE BECAUSE THE LEAD AND ARSENIC IN THE AREA ARE FOUND IN SLAG (WHICH THEY SAY CANNOT BE DIGESTED BY HUMANS), AND BECAUSE EPA DID NOT USE THE DATA THE PRPS COLLECTED IN THE BLOOD-LEAD STUDY, WHICH GENERALLY SHOWED LIMITED LEAD UPTAKE IN CHILDREN'S BLOOD. EPA RESPONDED THAT THE BLOOD-LEAD STUDY PROVIDES DATA ONLY FROM A SINGLE POINT IN TIME AND THEREFORE IS NOT AN ACCURATE PORTRAYAL OF POTENTIAL EXPOSURE. EPA RESPONDED FURTHER THAT IT HAS TO TAKE THE CONSERVATIVE ROUTE AND PROVIDE FOR PROTECTIVENESS IN A RANGE OF POSSIBLE SCENARIOS. THIS REQUIRES THAT EPA SET ACTION LEVELS THAT PROTECT INDIVIDUALS WHOSE ACTIVITIES MIGHT RESULT IN SIGNIFICANT EXPOSURE OVER TIME, RATHER THAN BASING ITS ACTION LEVELS ON A STUDY THAT FOCUSED ON A PARTICULAR POINT IN TIME. EPA DISAGREED WITH THE PRPS PREMISE THAT THE CONTAMINATION IS CONTAINED IN SLAG, BUT RATHER REAFFIRMED ITS SCIENTIFIC OPINION THAT A MAJOR PORTION OF THE CONTAMINATION COMES FROM TAILINGS.

- STATISTICS

WHEN QUESTIONED ABOUT STATISTICAL METHODS, MOST SPECIFICALLY, CONTROL OF VARIABLES, DATA SETS, USE OF MODELS, AGGREGATE SIZE AND COMPOSITION, AND BASELINE RISK ASSESSMENT METHODOLOGIES, EPA INDICATED THAT ANALYTICAL PRECISION WAS UPHELD AND THAT NO SUBJECTIVITY WAS INTRODUCED INTO THE INTERPRETATION OF THE DATA.

2.0 INTRODUCTION AND BACKGROUND

SINCE 1982 THE UTAH DEPARTMENT OF HEALTH (UDOH) AND EPA HAVE BEEN INVOLVED IN EFFORTS TO MITIGATE AND CLEAN UP CONTAMINATION AT AND NEAR THE SHARON STEEL MILL SITE IN MIDVALE, UTAH. AT THAT TIME, IT CAME TO THE ATTENTION OF UDOH THAT SOME RESIDENTS OF MIDVALE WERE USING TAILINGS FROM THE MILL SITE IN SANDBOXES AND GARDENS. THESE ACTIVITIES RAISED COMMUNITY CONCERN WHEN THIS DISCOVERY WAS MADE AND PUBLICIZED. THE PRIMARY CONCERN WAS THE POTENTIAL FOR ADVERSE HEALTH EFFECTS TO CHILDREN WHO MIGHT PLAY IN THE TAILINGS-FILLED SANDBOXES, AND TO THE GENERAL POPULATION FROM CONSUMPTION OF VEGETABLES GROWN IN THE CONTAMINATED SOIL.

MIDVALE IS AN OLDER COMMUNITY ADJACENT TO THE MILL SITE WITH A POPULATION OF ABOUT 12,200.

EPA PROPOSED THE MILL SITE FOR LISTING ON ITS NATIONAL PRIORITIES LIST (NPL) IN 1984. THE NPL IS A NATIONWIDE LIST OF SITES THAT ARE ELIGIBLE FOR INVESTIGATION AND CLEANUP UNDER THE SUPERFUND PROGRAM. THE SITE WAS LISTED OFFICIALLY ON THE NPL ON AUGUST 28,1990. EPA COMPLETED A PRELIMINARY FEASIBILITY STUDY (FS) IN JULY, 1989 FOR THE REMEDIATION OF TAILINGS AT THE SHARON STEEL MILL SITE. EPA'S PROPOSED PLAN WAS TO PLACE A LOW PERMEABILITY CAP OVER ALL CONTAMINATED MATERIALS. A CAP IS A MULTI-LAYER COVER WHICH WILL PREVENT DIRECT CONTACT WITH CONTAMINATED SOILS. THIS ELIMINATES AIRBORNE TRANSPORT OF CONTAMINATED MATERIALS AND MINIMIZES THE VERTICAL PASSAGE OF WATER THROUGH THE CONTAMINATED SOILS.

THE STATE OF UTAH, CITY OF MIDVALE, AND NUMEROUS CITIZENS EXPRESSED STRONG CONCERN REGARDING THE PLAN AND ASKED THAT EPA FURTHER STUDY RESIDENTIAL SOILS NEAR THE MILL SITE, AND SUBSEQUENTLY EVALUATE POTENTIAL IMPACTS ON THE GROUND WATER BENEATH THE TAILINGS. UPON CONSIDERATION OF THESE COMMENTS, EPA DELAYED ITS DECISION ON THE MILL SITE IN ORDER TO CONDUCT FURTHER STUDIES ON GROUND WATER AND RESIDENTIAL SOILS, DIVIDING THE SITE INTO TWO OPERABLE UNITS. OPERABLE UNIT ONE (OU1) FOCUSES ON THE MILL SITE AND GROUND WATER ISSUES. OPERABLE UNIT TWO (OU2), WHICH IS THE SUBJECT OF THIS RESPONSIVENESS SUMMARY, FOCUSES ON RESIDENTIAL AND COMMERCIAL OPEN SPACE WITH SOIL COVER, PREDOMINANTLY YARDS, GARDENS, AND VACANT LOTS IN MIDVALE.

THE FEASIBILITY STUDY FOR OU2 DEVELOPED, SCREENED, AND EVALUATED FIVE ALTERNATIVES TO ADDRESS CONTAMINATED RESIDENTIAL SOILS. THESE ARE:

1. NO ACTION - NO REMEDIAL ACTIVITIES WOULD BE CONDUCTED TO REDUCE OR CLEAN UP THE HAZARDS AT THE SITE; HOWEVER, CONTINUED SITE MONITORING OF SOILS CONTAMINATION WOULD BE CONDUCTED.
2. CAPPING WITH NATIVE SOIL - THE EXISTING YARD VEGETATION, EXCLUDING CERTAIN TREES AND SHRUBS, WOULD BE REMOVED TO THE ROOT ZONE, AND A GEOTEXTILE WOULD BE PLACED OVER THE CONTAMINATED SOIL THEN COVERED WITH A SIX-INCH LAYER OF CLAY AND A SIX-INCH LAYER OF CLEAN, NATIVE SOIL.
3. EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL TO THE MILL SITE - CONTAMINATED SURFACE SOILS AND VEGETATION WOULD BE REMOVED TO THE 500 PARTS PER MILLION (PPM) LEAD ACTION LEVEL. THE CONTAMINATED SOILS WOULD THEN BE TRANSPORTED TO AND STORED TEMPORARILY AT THE MILL SITE (OU1), TO BE ADDRESSED AS PART OF THE MILL SITE REMEDY.
4. IN-PLACE STABILIZATION OF CONTAMINATED SOILS - THE SURFACE YARD VEGETATION WOULD BE REMOVED, FOLLOWED BY IN-PLACE STABILIZATION OF CONTAMINATED SOIL THAT EXCEEDS THE ACTION LEVEL, THEN A GEOTEXTILE WOULD BE PLACED OVER THE STABILIZED SOIL AND COVERED WITH FOUR INCHES OF NATIVE SOIL.
5. EXCAVATION OF CONTAMINATED SOIL WITH TREATMENT PRIOR TO DISPOSAL - THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE NO. 3, EXCEPT THE DISPOSAL PHASE WOULD BE MODIFIED TO EXTRACT THE CONTAMINATION FROM THE SOIL USING AN ACID SOLUTION OR CHEMICAL AGENT THAT WOULD FREE THE METALS FROM THE SOIL.

ALTERNATIVE NO. 3 WAS SELECTED AS EPA'S PREFERRED ALTERNATIVE AND WAS PUBLISHED IN A PROPOSED PLAN RELEASED IN JUNE, 1990.

3.0 THE COMMUNITY RELATIONS PROGRAM AT THE SHARON STEEL SITE

THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) (SECTIONS 113(K)(2)(B)(I-V) AND 117) REQUIRES THAT EPA AND THE STATE OF UTAH KEEP THE COMMUNITY INFORMED AND ENCOURAGE THEM TO PARTICIPATE IN THE DECISION-MAKING PROCESS IN SELECTING A REMEDY FOR THE SUPERFUND SITE IN THEIR NEIGHBORHOOD. AT A MINIMUM, THE LEGISLATION REQUIRES: (1) NOTICE TO POTENTIALLY AFFECTED PERSONS AND THE PUBLIC; (2) A REASONABLE OPPORTUNITY TO COMMENT; (3) AN OPPORTUNITY FOR PUBLIC HEARING; (4) A RESPONSE TO EACH SIGNIFICANT CATEGORY OF COMMENT SUBMITTED; AND (5) A STATEMENT OF THE BASIS AND PURPOSE OF THE SELECTED ACTION.

THIS SECTION DESCRIBES THE SPECIFIC COMMUNITY PARTICIPATION ACTIVITIES THAT OCCURRED IN THE PROCESS OF SELECTING A REMEDY FOR THE OU2 RESIDENTIAL SOILS; ATTACHMENT A (PAGE 63) CONTAINS AN ABBREVIATED VERSION OF THIS COMMUNITY RELATIONS PROCESS. THESE ACTIVITIES EXCEED THE MINIMUM REQUIREMENTS SIGNIFICANTLY. INDICATING A COMMITMENT BY EPA AND THE STATE OF UTAH TO MEET BOTH THE LETTER OF THE LAW AND THE SPIRIT OF COMMUNITY PARTICIPATION AT THIS SITE. THIS RESPONSIVENESS SUMMARY FULFILLS ONE OF THE KEY PUBLIC PARTICIPATION REQUIREMENTS OF CERCLA; IT CONTAINS A RESPONSE TO EACH BE COMMENT SUBMITTED BY THE PUBLIC. THE FOLLOWING PARAGRAPHS ARE A CHRONOLOGY OF THE COMMUNITY PARTICIPATION ACTIVITIES FROM 1982 THROUGH THE PRESENT:

IN 1982, THE UTAH DEPARTMENT OF HEALTH ADVISED THE PUBLIC AGAINST REMOVING TAILINGS FROM THE MILL SITE FOR USE IN HOMES, LANDSCAPING, GARDENS, AND SANDBOXES.

IN 1983, COMMUNITY INTERVIEWS WERE HELD FOR THE PURPOSE OF WARNING NEARBY RESIDENTS ABOUT USING TAILINGS FOR SANDBOXES AND GARDENS, AND A PRESS RELEASE WAS ISSUED DETAILING THE POTENTIAL THAT THE SITE WOULD BE LISTED ON THE SUPERFUND NATIONAL PRIORITIES LIST OF SITES TO BE CLEANED UP. SHORTLY AFTERWARD, ANOTHER PRESS RELEASE WARNED RESIDENTS NOT TO GARDEN IN SOILS CONTAINING TAILINGS.

IN 1985, A FACT SHEET, WHICH BRIEFLY DESCRIBED THE SITE AND POTENTIAL CONTAMINATION, WAS MAILED TO MIDVALE RESIDENTS NEAR THE SITE. INTERVIEWS WERE ALSO CONDUCTED WITH RESIDENTS OF MIDVALE. THE MIDVALE CITY COUNCIL CREATED THE TAILINGS COMMITTEE, LATER CALLED THE COMMUNITY LIAISON COUNCIL, TO DISSEMINATE SITE INFORMATION TO INTERESTED CITIZENS.

IN 1986, THE STATE OF UTAH MET WITH LOCAL OFFICIALS AND THE COMMUNITY LIAISON COUNCIL TO DISCUSS PUBLIC CONCERNS REGARDING THE SITE. AS A RESULT OF THESE DISCUSSIONS, THE STATE OF UTAH POSTED SIGNS IN ENGLISH AND ASIAN LANGUAGES TO WARN AGAINST SITE ENTRY, AND DISTRIBUTED TO AREA RESIDENTS LITERATURE IN ENGLISH AND FOUR ASIAN LANGUAGES (VIETNAMESE, LAOTIAN, CAMBODIAN, AND HMONG) WARNING AGAINST SITE ACCESS. IN ADDITION, THE STATE OF UTAH CONDUCTED AN EPIDEMIOLOGICAL SURVEY OF THE NEIGHBORING ASIAN POPULATION TO EVALUATE CONCERNS REGARDING HEALTH EFFECTS.

IN 1987, EPA AND THE STATE OF UTAH MET WITH MIDVALE OFFICIALS TO ESTABLISH INFORMATION REPOSITORIES. THE REPOSITORIES IDENTIFIED WERE THE RUTH VINE TYLER LIBRARY IN MIDVALE, THE MIDVALE CITY HALL, AND THE UTAH DEPARTMENT OF HEALTH. FUTURE MEETING LOCATIONS WERE IDENTIFIED AS THE MIDVALE CITY AUDITORIUM, THE MIDVALE MIDDLE SCHOOL, THE HILLCREST HIGH SCHOOL, THE UTAH POWER & LIGHT AUDITORIUM, AND THE MIDVALE BOWERY. A FACT SHEET, MAILED OUT IN SEPTEMBER, 1987, SUMMARIZED EPA'S SUPERFUND PROCESS AND DESCRIBED THE STUDY BEING CONDUCTED.

IN 1988, TWO FACT SHEET UPDATES WERE MAILED TO MIDVALE RESIDENTS; ONE IN MAY AND THE OTHER IN AUGUST. IN ADDITION, THE FINAL COMMUNITY RELATIONS PLAN WAS COMPLETED IN AUGUST, 1988.

IN EARLY 1989, A PRESS RELEASE WAS SENT OUT REGARDING FENCING OF THE SITE. TWO PRESS RELEASES WERE SENT OUT IN JUNE: ONE CLARIFYING THE DECISION PROCESS ON CLEANUP OF THE SITE, AND THE OTHER ANNOUNCING THE PREFERRED ALTERNATIVE AND PROPOSED PLAN. THE LATTER RELEASE ANNOUNCED THE DATE OF THE PUBLIC COMMENT PERIOD AND THE DATE AND LOCATION OF THE FEASIBILITY STUDY/PROPOSED PLAN PUBLIC MEETING, WHICH WAS ADVERTISED IN THE THREE LOCAL NEWSPAPERS ON JUNE 14, 1989. AT THIS TIME, THE SITE WAS STILL CONSIDERED ONE OPERABLE UNIT. FOLLOWING ANNOUNCEMENT OF THE PUBLIC MEETING, A FACT SHEET, PROPOSED PLAN FOR SHARON STEEL/MIDVALE TAILINGS SITE, WAS MAILED TO RESIDENTS IN MIDVALE. THE COMMUNITY RELATIONS PLAN WAS THEN REVISED ON JULY 31, 1989. IN AUGUST, THE PUBLIC MEETING ON THE PROPOSED PLAN AT THE MIDVALE BOWERY WAS ADVERTISED, A PRESS RELEASE WAS ISSUED, AND A CONGRESSIONAL BRIEFING AND A MEETING WITH THE UTAH DEPARTMENT OF HEALTH WERE HELD. THIS PUBLIC MEETING TOOK PLACE ON AUGUST 17, 1989.

IN RESPONSE TO COMMENTS ON THE PROPOSED PLAN FOR THE SITE, EPA DID NOT DECIDE TO ADOPT THE PREFERRED ALTERNATIVE. INSTEAD, EPA EXTENDED THE PUBLIC COMMENT PERIOD AND THE STUDY PERIOD FOR THE SITE, IDENTIFIED A SEPARATE OPERABLE UNIT FOR RESIDENTIAL SOILS, AND ISSUED A PRESS RELEASE ANNOUNCING THESE CHANGES. A PLAN FOR RESPONDING TO PUBLIC COMMENT WAS DEVELOPED; MOST OF THE 1990 ACTIVITIES WERE A RESULT OF THIS PLAN. COMMUNITY INTERVIEWS WERE CONDUCTED ON NOVEMBER 6, 7, AND 8, 1989 TO UPDATE EPA ON ITS UNDERSTANDING OF THE CONCERNS OF MIDVALE RESIDENTS AND BUSINESS PEOPLE, AND TO REVISE THE COMMUNITY RELATIONS PLAN. ON NOVEMBER 28, EPA'S REGIONAL ADMINISTRATOR MET WITH THE UTAH DEPARTMENT OF HEALTH; THE DESERET NEWS EDITORIAL BOARD; THE SALT LAKE CITY TRIBUNE EDITORIAL BOARD; AND THE GOVERNOR OF UTAH, NORMAN BANGERTER. THAT SAME DAY, EPA AND THE STATE OF UTAH HOSTED PUBLIC FORUM MEETING #1, WHICH WAS HELD AT THE UTAH POWER & LIGHT AUDITORIUM. THE MEETING WAS ADVERTISED IN THE SALT LAKE CITY AND LOCAL NEWSPAPERS, AND A PRESS RELEASE WAS ISSUED. EPA AND THE GOVERNOR OF UTAH JOINTLY SENT OUT INVITATIONS TO SELECTED OFFICIALS AND INTERESTED PARTIES INVITING THEM TO ATTEND. AT THE MEETING, A STATUS REPORT WAS GIVEN ON SITE INVESTIGATIONS AND STUDIES.

IN JANUARY, 1990, A FACT SHEET, QUESTIONS AND ANSWERS ABOUT LEAD AND ARSENIC IN THE SOILS, WAS DEVELOPED AND MAILED TO OVER 1,200 MIDVALE RESIDENTS. IN ADDITION, AN ADVERTISEMENT WAS PLACED IN THE SALT LAKE CITY AND LOCAL NEWSPAPERS ANNOUNCING CRITERIA FOR SUBMITTAL OF PRIVATE INDUSTRY TAILINGS REPROCESSING PROPOSALS, AND A PREPROPOSAL CONFERENCE FOR INTERESTED REPROCESSORS WAS HELD IN SALT LAKE CITY. THE DECISION TO PROCEED ON SEPARATE SCHEDULES FOR OU1 AND OU2 WAS MADE. PUBLIC FORUM MEETING #2 WAS ADVERTISED AND HELD IN MIDVALE IN FEBRUARY FOR PURPOSES OF UPDATING RESIDENTS ON GROUND WATER INVESTIGATIONS, SOLICITATION OF PRIVATE INDUSTRY REPROCESSING PROPOSALS, SOILS INVESTIGATIONS, AND THE SETTING OF SOIL ACTION LEVELS. EPA AND THE UTAH DEPARTMENT OF HEALTH JOINTLY SENT OUT INVITATION LETTERS TO SELECTED OFFICIALS AND INTERESTED PARTIES, A PRESS RELEASE WAS ISSUED ANNOUNCING THE MEETING, AND THE MEETING WAS HIGHLIGHTED IN THE JANUARY FACT SHEET. REVISION OF THE COMMUNITY RELATIONS PLAN WAS COMPLETED ON FEBRUARY 12, 1990.

IN MARCH, 1990, ANOTHER FACT SHEET, REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) PROJECT STATUS REPORT, WAS MAILED TO MIDVALE RESIDENTS. TWELVE REPROCESSING PROPOSALS WERE RECEIVED AND EVALUATED. THERE WERE ALSO NUMEROUS TELEPHONE CONTACTS BETWEEN THE REPROCESSORS AND EPA.

IN MAY, 1990, A SOILS DATA LETTER, DETAILING THE RESULTS OF THE SOIL SAMPLING, WAS SENT TO OVER 200 MIDVALE RESIDENTS WHO PARTICIPATED IN THE RESIDENTIAL SOILS STUDY. AVAILABILITY SESSIONS WERE SCHEDULED TO ANSWER AND INTERPRET THE SOILS DATA RESULTS DURING THE DAY AND EVENING ON MAY 22, AND DURING THE DAY ON MAY 23. A FEASIBILITY STUDY PREVIEW MEETING WAS HELD ON MAY 23 TO GIVE RESIDENTS A PREVIEW OF THE OU2 FEASIBILITY STUDY, ANSWER QUESTIONS, AND HEAR CONCERNS PRIOR TO THE OFFICIAL PUBLIC MEETING.

IN JUNE, 1990, A FACT SHEET, PROPOSED PLAN FOR OPERATE UNIT 2: RESIDENTIAL SOILS, WAS MAILED TO MIDVALE RESIDENTS, A PRESS RELEASE WAS ISSUED, AND AN ADVERTISEMENT WAS PLACED IN THE SALT LAKE CITY AND LOCAL NEWSPAPERS ANNOUNCING THE PUBLIC COMMENT PERIOD AND PUBLIC MEETING ON THE PROPOSED PLAN FOR OU2. APPROXIMATELY 80 PEOPLE ATTENDED THIS PUBLIC MEETING ON JUNE 14, 1990. COPIES OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT FOR OU2 WERE PLACED IN THE REPOSITORIES.

IN JULY, 1990, THE POTENTIALLY RESPONSIBLE PARTIES (PRPS) REQUESTED AN EXTENSION OF THE PUBLIC COMMENT PERIOD. EPA AGREED AND PLACED AN ADVERTISEMENT IN THE SALT LAKE CITY AND LOCAL NEWSPAPERS ANNOUNCING THE ADDITIONAL 30-DAY EXTENSION, WHICH ENDED ON AUGUST 8, 1990.

IN AUGUST, 1990, EPA BRIEFED CONGRESSIONAL AIDES, THE MAYOR OF MIDVALE, AND THE MAYOR OF NEIGHBORING WEST JORDAN AT A MEETING ON THE OU2 FEASIBILITY STUDY.

IN ADDITION TO THE ABOVE SPECIFIC HIGHLIGHTS, EPA AND THE STATE OF UTAH COOPERATED THROUGHOUT 1989 AND 1990 TO CONDUCT THE FOLLOWING ACTIVITIES, ON NUMEROUS OCCASIONS:

- MET WITH MIDVALE OFFICIALS TO DISCUSS THE STATUS OF EPA'S AND THE STATE'S ACTIVITIES.
- FORMULATED AND UPDATED A LIST OF CONTACTS AND INTERESTED PARTIES. THIS LIST INCLUDES FEDERAL-ELECTED OFFICIALS, STATE-ELECTED OFFICIALS, UTAH DEPARTMENT OF HEALTH OFFICIALS, AREA MEDIA, AREA INTERESTED GROUPS AND INDIVIDUALS, AND MANY LOCAL RESIDENTS. THE MAILING LIST CONTAINS OVER 1,200 ENTRIES.
- ORGANIZED THE TECHNICAL ADVISORY COMMITTEE (TAC) ON OCTOBER 19, 1989 IN RESPONSE TO COMMENTS AT THE AUGUST 17, 1989 PUBLIC MEETING. THE PURPOSE OF THIS GROUP WAS TO PROVIDE A FORUM FOR EPA, THE STATE OF UTAH, THE PRPS, LOCAL OFFICIALS, AND OTHER FEDERAL AGENCIES WITH EXPERTISE IN SITE CONDITIONS, AND FOR THEIR RESPECTIVE CONTRACTORS TO INTERACT AND OBTAIN TECHNICAL INPUT FROM ONE ANOTHER AND OTHER INTERESTED PARTIES. THE TAC MET ABOUT TWICE A MONTH AND WAS COMPRISED OF REPRESENTATIVES FROM THE UTAH DEPARTMENT OF HEALTH, THE SALT LAKE CITY/COUNTY HEALTH DEPARTMENT, THE PRPS, THE MIDVALE CITY GOVERNMENT, THE US GEOLOGICAL SURVEY, AND THE US BUREAU OF RECLAMATION. THESE MEETINGS WERE OPEN TO THE PUBLIC.

4.0 SUMMARY OF MAJOR COMMENTS AND EPA'S RESPONSES

DURING EPA'S PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN FOR THE REMEDIATION OF RESIDENTIAL SOILS AT THE SHARON STEEL/MIDVALE TAILINGS SUPERFUND SITE, COMMENTS WERE RECEIVED BOTH VERBALLY AT A PUBLIC MEETING HELD ON JUNE 14, 1990 AND IN WRITING.

EPA RECEIVED COMMENTS ON THE PROPOSED PLAN AND FEASIBILITY STUDY REPORT FROM A RANGE OF COMMENTERS, INCLUDING THREE GOVERNMENTAL BODIES (THE STATE OF UTAH, SALT LAKE CITY/COUNTY, AND THE CITY OF MIDVALE), AND THREE INDIVIDUAL GOVERNMENT OFFICIALS (INCLUDING US REPRESENTATIVE WAYNE OWENS AND MEMBERS OF THE MIDVALE CITY COUNCIL). OTHER COMMENTERS INCLUDED THREE ORGANIZATIONS, SUCH AS TOXIC WATCH UTAH, AND FIVE PRIVATE COMPANIES, INCLUDING UTAH CHEMICAL CORPORATION. IN ADDITION, SEVEN PRIVATE CITIZENS MADE COMMENTS. FINALLY, THE PRPS MADE SUBSTANTIAL COMMENTS IN FOUR SEPARATE LETTERS. IN ALL, SEVEN INDIVIDUALS AND FOURTEEN GROUPS COMMENTED.

THE GENERAL TONE OF THESE COMMENTS WAS POSITIVE. CONGRESSMAN OWENS, THE STATE OF UTAH, SALT LAKE CITY/COUNTY, AND THE CITY OF MIDVALE ALL EXPRESSED SUPPORT FOR EPA'S PROPOSED PLAN FOR REMEDIATING RESIDENTIAL SOILS. THERE WERE, HOWEVER, A NUMBER OF CONCERNS EXPRESSED REGARDING THE PROPOSED PLAN.

THE COMMENTS AND RESPONSES ARE ORGANIZED IN TWO PARTS BELOW:

- PART 1. NON-TECHNICAL COMMENTS INCLUDE SUMMARIES OF MOST REMARKS MADE BY CITIZENS, LOCAL GOVERNMENT, ENVIRONMENTAL ORGANIZATIONS. PRIVATE ENTERPRISE, STATE AND SOME PRP COMMENTS. POLICY COMMENTS ARE GENERALLY INCLUDED IN THIS SECTION.
- PART 2. TECHNICAL COMMENTS PROVIDE A COMPREHENSIVE SET OF TECHNICAL AND LEGAL COMMENTS AND EPA'S DETAILED RESPONSES. PART 2 ADDRESSES ALL OF THE PRPS' COMMENTS. IN SOME CASES, COMMENTS ADDRESSED BRIEFLY IN PART 1 ARE ELABORATED IN PART 2. ANY POINT OF CONFLICT OR AMBIGUITY BETWEEN THE TWO PARTS WILL BE RESOLVED IN FAVOR OF THE DETAILED TECHNICAL AND LEGAL PRESENTATION IN PART 2. IN SOME CASES, THE PART 1 ANSWER IS CONSIDERED TO BE COMPLETE AND REQUIRES NO FURTHER RESPONSE.

EACH COMMENT IS FOLLOWED BY A NOTE IN PARENTHESES. THESE NOTES IDENTIFY THE PARTY OR PARTIES MAKING THE COMMENT. THE FOLLOWING CATEGORIES OF COMMENTERS ARE IDENTIFIED:

- TRANSCRIPT: THE TRANSCRIPT OF THE PUBLIC MEETING INCLUDES COMMENTS BY 17 PERSONS. EACH COMMENTER WAS NUMBERED (TRANSCRIPT 1 THROUGH TRANSCRIPT 17), AND HIS/HER COMMENTS ARE IDENTIFIED BY THOSE NUMBERS. (TRANSCRIPT: 99 TOTAL PAGES).
- STATE: ONE COMMENT LETTER WAS SUBMITTED FROM THE STATE OF UTAH (STATE LETTER: 11 TOTAL PAGES).

- LETTER: FOUR LETTERS OF COMMENTS WERE SUBMITTED. THE LETTERS WERE NUMBERED (LETTER 1 THROUGH LETTER 4), AND THE COMMENTS MADE IN EACH LETTER ARE IDENTIFIED BY THOSE NUMBERS (COMMENT LETTERS: 12 TOTAL PAGES).
- PRP (POTENTIALLY RESPONSIBLE PARTY): FOUR PRP DOCUMENTS WERE SUBMITTED. THESE DOCUMENTS WERE NUMBERED (PRP 1 THROUGH PRP 4), AND THE COMMENTS MADE IN EACH DOCUMENT ARE IDENTIFIED BY THOSE NUMBERS (PRP COMMENT DOCUMENTS: 103 TOTAL PAGES).

AS MUCH AS POSSIBLE, COMMENTS WERE SUMMARIZED AND GROUPED TO PROVIDE AN OVERVIEW OF THE COMMENTS AND TO GIVE A SENSE AS TO WHICH GENERAL TOPICS GENERATED THE MOST INTEREST OR CONCERNS. THIS RESPONSIVENESS SUMMARY IS NOT INTENDED TO BE A DETAILED LISTING OF ALL COMMENTS. ATTACHMENT B, FOUND ON PAGE 67, PROVIDES A LIST OF INDIVIDUALS WHO COMMENTED IN EACH CATEGORY.

PART 1. NON-TECHNICAL COMMENTS AND RESPONSES

NON-TECHNICAL COMMENTS FOCUSED ON THE ADEQUACY OF EPA'S STUDIES, HEALTH RISKS, ACTION LEVELS, GROUND WATER, SOILS, IMPLEMENTATION, COSTS, ECONOMICS, ALTERNATIVES, AND PROCEDURAL ISSUES. THESE CONCERNS, FOLLOWED BY EPA'S RESPONSES, ARE PRESENTED BELOW. A SIGNIFICANT NUMBER OF PEOPLE COMMENTED ON OU1 (CLEANUP OF THE MILL TAILINGS SITE AND RELATED AIR AND GROUND WATER ISSUES); THESE COMMENTS ARE PRESENTED IN THE "REMAINING CONCERNS" SECTION AT THE END OF PART 1. EPA WILL RESPOND TO THESE LATTER REMARKS IN THE OU1 RESPONSIVENESS SUMMARY, AFTER OU1 STUDIES HAVE BEEN COMPLETED IN LATE 1990 AND EARLY 1991.

REGARDING EPA'S PREFERRED ALTERNATIVE FOR OU2, THREE TOPICS WERE THE FOCUS OF A SIGNIFICANT NUMBER OF COMMENTS:

- TEMPORARY STORAGE OF RESIDENTIAL SOILS AT THE MILL SITE:

RESIDENTS EXPRESSED STRONG CONCERN MOST FREQUENTLY ABOUT TEMPORARY STORAGE OF OU2 RESIDENTIAL SOILS AT THE MILL SITE. THE CITY OF MIDVALE ENCOURAGED EPA TO DETERMINE THE FINAL DISPOSITION OF THE RESIDENTIAL SOILS AT THE SAME TIME IT MAKES A FINAL DECISION ON OU1. THIS WOULD ALLEVIATE THE COST OF TEMPORARILY STORING THE SOILS AT THE MILL SITE, THEN REMOVING THE SOILS FROM THE MILL SITE AND DISPOSING OF THEM SOMEWHERE ELSE; AND IT WOULD NOT INTERFERE WITH THE POSSIBLE REPROCESSING OF THE TAILINGS. EPA'S RESPONSE TO THE SOILS DISPOSAL QUESTION IS PRESENTED IN THE IMPLEMENTATION SECTION BEGINNING ON PAGE 20.

- BLOWING DUST FROM THE TAILINGS:

THE TOPIC RANKING SECOND IN NUMBER OF COMMENTS RELATES TO HEALTH RISKS. MANY COMMENTERS EXPRESSED CONCERN THAT THE RESIDENTIAL SOILS PLACED ON THE MILL SITE MAY ADD TO THE PROBLEM OF BLOWING DUST. BLOWING DUST WAS VIEWED AS A MAJOR NUISANCE AND POTENTIAL SOURCE OF RECONTAMINATION OF RESIDENTIAL SOILS IF PLACED ON THE OUT MILL SITE. EPA'S RESPONSE TO THE BLOWING DUST QUESTION IS PRESENTED IN THE HEALTH RISKS AND ACTION LEVELS SECTION BEGINNING ON PAGE 15.

- GROUND WATER:

A SIGNIFICANT NUMBER OF COMMENTS WERE MADE BY MIDVALE RESIDENTS AND THE STATE OF UTAH REGARDING POTENTIAL CONTAMINATION OF AREA GROUND WATER AND EPA'S PLANS TO PROTECT IT. EPA'S RESPONSE TO THE GROUND WATER QUESTION IS PRESENTED IN THE GROUND WATER SECTION BEGINNING ON PAGE 18.

A. ADEQUACY OF STUDIES

A.1 COMMENT: DOES THE REMEDY TAKE INTO ACCOUNT THAT THE TAILINGS, SLAG, AND OTHER CONTAMINATED MEDIA THAT MAY BE CONSIDERED HAZARDOUS OR INDUSTRIAL WASTE MAY HAVE BEEN USED AS BACKFILL IN THE MIDVALE AREA? (TRANSCRIPT 7)

EPA'S RESPONSE: IT IS POSSIBLE THAT TAILINGS AND SLAG MATERIAL WERE PHYSICALLY IMPORTED AND USED AS BACKFILL IN THE MIDVALE AREA. EPA BELIEVES, HOWEVER, THAT WIND-BLOWN TAILINGS COMPRISE A MAJOR PORTION OF THE CONTAMINATION AT OU2. AS IT IS IMPRACTICAL TO SEPARATE THE WIND-BLOWN MILL TAILINGS FROM TAILINGS, SLAG, AND OTHER MATERIALS THAT MAY HAVE BEEN PHYSICALLY IMPORTED, A SITE REMEDY WILL ADDRESS ALL SUCH ISSUES, WITH THE UNDERSTANDING THAT MILL TAILINGS ARE A MAJOR SOURCE OF CONTAMINATION IN THIS AREA. BASED ON INFORMATION GATHERED DURING THE REMEDIAL INVESTIGATION, THE CONTAMINATION EXISTS IN THE UPPER 18 INCHES OF SOIL, WITH THE BULK BEING FOUND IN THE FIRST 6 INCHES AND A VERY MINOR AMOUNT BEING FOUND FROM 6 TO 18 INCHES. CONTAMINATED SOILS WILL BE REMOVED TO THE 500 PARTS PER MILLION (PPM) LEAD ACTION LEVEL. IF THE VOLUME OF CONTAMINATED SOILS BELOW 18 INCHES SIGNIFICANTLY EXCEEDS EPA'S CURRENT ESTIMATE, BASED ON RI DATA, EPA WILL RE-EVALUATE DEPTH OF EXCAVATION. (*)

(*) RESPONSE IDENTIFIED WITH A ASTERISK ARE MORE FULLY DESCRIBED IN THE TECHNICAL SECTION OF THIS

RESPONSIVENESS SUMMARY.

A.2 COMMENT: WHAT ARE THE CRITERIA IN DETERMINING INDUSTRIAL WASTE OR HAZARDOUS WASTE? (TRANSCRIPT 7)

EPA'S RESPONSE: THE TAILINGS AND THE CONTAMINATION IN THE SOILS RESULTING THEREFROM ARE BENEFICIATION WASTES WHICH ARE AUTOMATICALLY EXEMPT FROM BEING CONSIDERED HAZARDOUS WASTES UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). THE TREATMENT AND DISPOSAL OF THESE SOILS, THOUGH NOT CONSIDERED HAZARDOUS WASTES, WILL HAVE TO MEET CERTAIN RELEVANT AND APPROPRIATE REQUIREMENTS OF RCRA.

INDUSTRIAL WASTE IS AN INTERMEDIATE CATEGORY BETWEEN SOLID WASTE AND HAZARDOUS WASTE. THE STATE OF UTAH DOES NOT HAVE ANY SPECIFIC CRITERIA FOR DETERMINING INDUSTRIAL WASTE. GENERALLY, MATERIAL THAT IS NOT APPROPRIATE FOR DISPOSAL AT A GOVERNMENT-OWNED SANITARY LANDFILL WILL BE DISPOSED OF AT AN INDUSTRIAL LANDFILL.

A.3 COMMENT: EPA CANNOT PREPARE A MEANINGFUL RECORD OF DECISION (ROD) FOR OU2 UNTIL THE PERTINENT STUDIES ARE COMPLETED AND AN OPPORTUNITY FOR PUBLIC COMMENT HAS BEEN PROVIDED. (PRP 1)

EPA'S RESPONSE: THE BASELINE RISK ASSESSMENT, THE REMEDIAL INVESTIGATION ADDENDUM, THE DRAFT FEASIBILITY STUDY, AND ALL OTHER RELEVANT STUDIES HAVE BEEN COMPLETED, AND EPA IS CURRENTLY REVIEWING ALL ORAL AND WRITTEN COMMENTS ON THESE STUDIES. THE ROD FOR OU2 WILL BE COMPLETED AND PUBLISHED BY THE END OF SEPTEMBER, 1990.

A.4 COMMENT: APPLICATION OF THE KRIGING MODEL DOES NOT PRODUCE RELIABLE SOILS CONTAMINATION CONTOUR MAPS. (PRP 1)

EPA'S RESPONSE: THE KRIGING (GEOSTATISTICAL) METHODS USED IN THIS INVESTIGATION TO ESTIMATE SPATIAL DISTRIBUTION AND VOLUME OF CONTAMINATED SOILS, AND THE RESULTING MAPS, CAN BE RELIABLY USED TO PREDICT CONCENTRATION CONTOURS. KRIGING IS AN ACCEPTED METHOD FOR CONSTRUCTING SUCH MAPS. (*)

A.5 COMMENT: THE BASELINE RISK ASSESSMENT IS UNRELIABLE. (PRP 4)

EPA'S RESPONSE: EPA BELIEVES THAT THE RESULTS OF THE BASELINE RISK ASSESSMENT ARE ACCURATE. EPA ALSO BELIEVES THAT THE PRPS AND THE BORNSCHEIN BLOOD-LEAD STUDY HAVE MISUSED THE BASELINE RISK ASSESSMENT METHODOLOGIES AND CONTINUE TO MISCONSTRUE THE INTENT OF THE BASELINE RISK ASSESSMENT CALCULATIONS. (*)

A.6 COMMENT: EPA USED A NUMBER OF UNSUPPORTED EXPOSURE ASSUMPTIONS AS INPUT PARAMETERS TO THE LEAD PROGRAM (A SOFTWARE VERSION OF THE INTEGRATED UPTAKE/BIOKINETIC MODEL (IU/BK)). THESE ASSUMPTIONS RESULTED IN THE OVERESTIMATION OF THE CONTRIBUTION OF SOIL-LEAD TO BLOOD-LEAD COMPARED TO WHAT WAS OBSERVED IN THE MIDVALE COMMUNITY LEAD STUDY (MCLS), WHICH TAKES INTO ACCOUNT A NUMBER OF VARIABLES THAT AFFECT BLOOD-LEAD AND INDICATES THAT THE MIDVALE BLOOD-LEAD LEVELS ARE NOT ELEVATED. (PRP 1, TRANSCRIPT 10)

EPA'S RESPONSE: EPA IS EVALUATING THE MIDVALE BLOOD-LEAD LEVEL STUDY. THIS EVALUATION WILL BE COMPLETED BEFORE IMPLEMENTATION OF THE REMEDY. EPA STRONGLY DISAGREES WITH DR. BORNSCHEIN'S BLOOD-LEAD STUDY RESULTS IN WHICH "REAL LIFE DATA MUST BE USED OVER MODELING APPROXIMATIONS WHEN ASSESSING RISK." EPA BELIEVES THE PRPS' BLOOD-LEAD STUDY INCORRECTLY INTERPRETS THEIR RESULTS IN A FASHION WHICH BIASES THE RESULTS TO SHOW PROTECTION OF THE AVERAGE RESIDENT AND DOES NOT TAKE INTO ACCOUNT THE NEED TO PROTECT THE MOST SENSITIVE POPULATION FROM RISK. (*)

B. HEALTH RISKS AND ACTION LEVELS

B.1 COMMENT: THE TEMPORARY STORAGE OF RESIDENTIAL SOILS AT THE MILL SITE MIGHT ADD TO THE PROBLEM OF BLOWING DUST BY CONTINUING TO CONTAMINATE OR RECONTAMINATE RESIDENTIAL SOILS. (TRANSCRIPT 5, 6, 11, 13,14, 15, LETTER 1, 3)

EPA'S RESPONSE: EPA AGREES THAT WIND-BLOWN TAILINGS COMPRISE A MAJOR PORTION OF THE CONTAMINATION AT OU2. EPA WILL PERFORM POLYMER DUST SUPPRESSION METHODS UNTIL A REMEDIAL ACTION IS PERFORMED ON OU1. THE POLYMER IS A CHEMICAL THAT SUPPRESSES BLOWING DUST. IT DOES NOT TOTALLY PREVENT THE DUST FROM BLOWING, BUT IT REDUCES THE BLOWING SIGNIFICANTLY. THIS METHOD IS DESCRIBED IN THE CONSENT DECREE BETWEEN EPA AND SHARON STEEL AS PART OF THE SHARON STEEL SETTLEMENT.

B.2 COMMENT: THE TOXICOLOGICAL LEVELS FOR RESIDENTIAL SOILS SHOULD HAVE A GREATER DEGREE OF PROTECTION THAN THOSE FOR COMMERCIAL OR INDUSTRIAL AREAS; I.E., LIVING AREAS SHOULD BE HELD TO HIGHER STANDARDS. (TRANSCRIPT 4, 7, LETTER 2)

EPA'S RESPONSE: EPA AGREES WITH THIS COMMENT.

B.3 COMMENT: THE MOST LIKELY SOURCES OF CONTAMINATION IN THE AREA WERE THE HISTORIC EMISSIONS OF THE SMELTER ON THE MIDVALE SLAG SITE TO THE NORTH. THESE EMISSIONS OCCURRED PRIOR TO THE BUILDING OF THE BAG HOUSE,

WHICH DISCHARGED GASES THAT WERE RELATIVELY TOXIC. (TRANSCRIPT 5, LETTER 3)

EPA'S RESPONSE: EPA ACKNOWLEDGES THAT THE SMELTER WAS A SOURCE OF CONTAMINATION, BUT ASSERTS THAT THE CONTAMINATION FROM THE TAILINGS CONTINUES TO PRESENT HEALTH AND ENVIRONMENTAL RISKS IN MIDVALE. IN ADDITION, THE RI ADDENDUM AND OTHER STUDIES SUPPORT TAILINGS AS THE PRIMARY CONTAMINANT SOURCE. (*)

B.4 COMMENT: THE TAILINGS POSE NO GREATER HEALTH THREAT THAN THE NATURAL ORES FROM WHICH THEY ORIGINATED. FLOTATION MILLING DID NOT CHANGE THE CHEMICAL COMPOSITION OF THE METAL COMPOUNDS. (TRANSCRIPT 5, LETTER 3)

EPA'S RESPONSE: THE MAIN DIFFERENCE BETWEEN THE ORE BODY AND THE MILL TAILINGS IS THE DEGREE OF EXPOSURE TO AIR AND WATER. WHILE IN THE ORE BODY, THE METALLIC SULFIDES ARE PROTECTED BY THE SURROUNDING ROCK FROM EXPOSURE TO AIR AND WATER. HOWEVER, DURING MINING AND MILLING, THE ORE IS REMOVED FROM THE MOUNTAIN AND SUBJECTED TO WEATHERING. THIS ORE IS THEN CRUSHED AND PLACED IN TAILINGS PILES, WHICH DRAMATICALLY INCREASES THE SURFACE AREA EXPOSED TO AIR AND WATER. THE SULFIDE MINERALS IN THE TAILINGS CAN THUS BE CHANGED MUCH MORE QUICKLY TO SULFATES BECAUSE OF THIS INCREASED EXPOSURE TO WEATHERING. A SIDE EFFECT OF THIS EXPOSURE AND INCREASED SURFACE AREA IS THAT SULFURIC ACID IS PRODUCED, WHICH FURTHER ACCELERATES THE RELEASE OF METALS FROM THE TAILINGS. GROUND WATER CAN BE CONTAMINATED BY BOTH METALS AND SULFATES IN THIS WAY. FURTHER, CONTAMINANT PATHWAYS (GROUND WATER, AIR) AND RECEPTORS (WATER WELLS, MIDVALE CITIZENS) EXIST IN THE MIDVALE VICINITY, AS OPPOSED TO A REMOTE MOUNTAIN LOCATION. FOR THESE REASONS, RISKS TO PUBLIC HEALTH AND THE ENVIRONMENT ARE MORE PREDOMINANT AT THE SITE THAN AT A MINERAL OUTCROP. (*)

B.5 COMMENT: THERE ARE NOT ANY NEGATIVE HEALTH EFFECTS IN THE COMMUNITY RESULTING FROM EXPOSURE TO THE TAILINGS OR SOILS, AND EPA HAS NOT SHOWN ANY EVIDENCE THAT SUCH HEALTH EFFECTS EXIST. THE ACTION LEVELS ARE, THEREFORE, TOO STRINGENT AND MAY PLACE AN UNDUE FINANCIAL BURDEN ON THE PRPS. (TRANSCRIPT 5, 10, LETTER 3)

EPA'S RESPONSE: EPA BELIEVES THAT THE REMEDIAL INVESTIGATION STUDIES AND ANALYSES CONDUCTED OVER THE PAST FEW YEARS INDICATE THAT THERE ARE HEALTH AND ENVIRONMENTAL RISKS DUE TO EXPOSURE TO THE TAILINGS. THE GOAL OF THE ACTION LEVELS IS TO ESTABLISH LEVELS THAT WOULD PROTECT ALMOST EVERYBODY. ANY LEVEL OF LEAD EXPOSURE COULD RESULT IN VERY HIGH BLOOD-LEAD LEVELS IN SOME CHILDREN. THE SAME EXPOSURE MIGHT RESULT IN MUCH LOWER BLOOD-LEAD LEVELS IN OTHER CHILDREN. IT IS NOT A STRAIGHTFORWARD PROCESS, BUT VARIES BY INDIVIDUAL. A 500 PPM BLOOD-LEAD LEVEL IN ONE YARD DOES NOT RESULT IN A CHILD WITH A GIVEN BLOOD-LEAD LEVEL. THERE WILL ALWAYS BE CHILDREN LIVING IN THE COMMUNITY WITH HIGH LEVELS OF SOIL-LEAD WHOSE BLOOD LEAD IS NOT AFFECTED. THE STUDIES CONDUCTED ALSO TAKE INTO ACCOUNT WHETHER OR NOT THE SOLUTION IS ECONOMICALLY FEASIBLE. EPA BELIEVES THE ACTION LEVELS MEET THE NECESSARY SAFE-LEVEL CRITERIA AND ARE COST EFFECTIVE. (*)

B.6 COMMENT: ARE EPA'S ACTION LEVELS FOR RESIDENTIAL SOILS IN MIDVALE CONSISTENT WITH THOSE SELECTED AT OTHER SITES? (TRANSCRIPT 10, LETTER 2)

EPA'S RESPONSE: WHILE THERE MAY BE GENERAL CORRELATION AMONG SITES, EVERY SUPERFUND SITE IS ADDRESSED INDIVIDUALLY. THE ASSUMPTIONS USED IN THE MIDVALE STUDIES HAVE BEEN VALIDATED AT OTHER SITES AND ARE CONSISTENT WITH BIOAVAILABILITY STUDIES PERFORMED ON THE TAILINGS MATERIAL FROM THE SITE. EPA BELIEVES THAT THE ACTION LEVELS CHOSEN FOR MIDVALE ARE SAFE.

B.7 COMMENT: WHAT PRELIMINARY EMERGENCY MEASURES ARE BEING CONSIDERED TO ADDRESS AREAS THAT REPRESENT AN IMMEDIATE THREAT TO HUMAN HEALTH AND THE ENVIRONMENT? (STATE 1)

EPA'S RESPONSE: AS DISCUSSED IN EPA'S RESPONSE TO COMMENT B.1, EPA WILL PERFORM POLYMER DUST SUPPRESSION METHODS UNTIL A REMEDIAL ACTION IS PERFORMED ON OUL.

B.8 COMMENT: IF THE SOILS WERE SHOWN TO POSE A HEALTH HAZARD, REMEDIAL ACTION WOULD CERTAINLY BE JUSTIFIED, REGARDLESS OF THE COST. (TRANSCRIPT 10)

EPA'S RESPONSE: EPA AGREES WITH THIS COMMENT AND BELIEVES THAT THE SOILS DO POSE A HEALTH THREAT AND THAT THE ACTION LEVELS CHOSEN ARE NOT ONLY SAFE, BUT ALSO ECONOMICALLY FEASIBLE.

B.9 COMMENT: IS 500 PPM LEAD AND 70 PPM ARSENIC A PRACTICAL, SAFE LEVEL FOR RESIDENTIAL YARDS, AS WELL AS FOR GARDEN SOIL? (TRANSCRIPT 1, 7)

EPA'S RESPONSE: AS DISCUSSED IN THE EPA'S RESPONSE TO COMMENT B.5, THE GOAL OF THE ACTION LEVELS IS TO ESTABLISH LEVELS THAT PROTECT THE MOST SENSITIVE POPULATION, CHILDREN BETWEEN THE AGES OF 0 TO 72 MONTHS OF AGE. EPA BELIEVES THAT THE CHOSEN ACTION LEVELS, 500 PPM LEAD AND 70 PPM ARSENIC, ARE PROTECTIVE TO THIS SENSITIVE POPULATION. THESE ACTION LEVELS WERE CHOSEN AND ARE CONSIDERED PROTECTIVE FOR ALL PATHWAYS OF EXPOSURE TO LEAD, EXCLUDING INGESTION OF HOMEGROWN LEAFY VEGETABLES. LEAFY VEGETABLES CAN CONCENTRATE THEIR UPTAKE OF LEAD. EPA, THEREFORE, BELIEVES THAT THE LEAD ACTION LEVEL THAT WILL BE PROTECTIVE FOR INGESTION OF VEGETABLES FROM HOME GARDENS IS 200 PPM LEAD. EPA HAS CHOSEN TO REMEDY GARDEN SOILS TO THIS ACTION LEVEL.

B.10 COMMENT: THE VALUES PRESENTED FOR THE PARAMETERS IN THE CADMIUM RISK EQUATION DO NOT APPEAR TO EQUAL THE

RECOMMENDED VALUE OF 136 MG/KG (MILLIGRAMS PER KILOGRAMS ANY USE OF THE VALUES PRESENTED YIELDS A DISCREPANCY IN THE CLEANUP GOAL. (STATE 1)

EPA'S RESPONSE: EPA NOTES THAT THIS DISCREPANCY WAS THE RESULT OF A MISPLACED DECIMAL POINT. THE ERROR HAS NO IMPACT ON THE FINAL OUTCOME BECAUSE EPA HAS NOT YET ESTABLISHED CLEANUP GOALS FOR CADMIUM.

C. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) ISSUES

C.1 COMMENT: THE STATE'S LIST OF OU2 ARARS IS NOT SITE-SPECIFIC. (PRP 1)

EPA'S RESPONSE: UNDER CERCLA AND THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) GUIDANCE, EPA BELIEVES THAT THE STATE'S JUNE 14, 1989 LIST OF ARARS IS SUFFICIENT AND HAS WORKED WITH THE STATE TO FURTHER REFINE THE LIST.

C.2 COMMENT: THE URANIUM MILL TAILINGS RADIATION CONTROL ACT AND THE UTAH WILDLIFE PROTECTION ACT SHOULD NOT BE CONSIDERED ARARS FOR OU2. (STATE 1)

EPA'S RESPONSE: EPA AGREES. THESE ACTS WILL NOT BE CONSIDERED AS ARARS FOR OU2.

C.3 COMMENT: THE STATE OF UTAH GROUND WATER REGULATIONS SHOULD BE LISTED AMONG THE PERTINENT CONTAMINANT-SPECIFIC ARARS. (STATE 1)

EPA'S RESPONSE: EPA AGREES THAT GROUND WATER ARARS SHOULD REMAIN WITH OU2, AND HAS INCLUDED A NUMBER OF STATE GROUND WATER REGULATIONS, INCLUDING, UTAH GROUND WATER PROTECTION RULES AND UTAH GROUND WATER QUALITY STANDARDS IN THE ARARS LIST FOR THE SITE.

C.4 COMMENT: THE STATE OF UTAH DOES NOT AGREE THAT EITHER CERCLA SECTION 121 OR THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN (NCP) REQUIRE IT TO BEAR THE INITIAL BURDEN OF PROVING CONSISTENT APPLICATION FOR ALL OF THE ARARS. (STATE 1)

EPA'S RESPONSE: CERCLA AND NCP ARE SILENT ON THIS MATTER, BUT THE ARARS GUIDANCE SUGGESTS THAT IT IS THE BURDEN OF THE STATE TO ASSURE THAT THE ARARS ARE PROMULGATED AND CONSISTENTLY APPLIED.

C.5 COMMENT: EPA'S DISCUSSION OF ARARS FOR GROUND WATER CONTAMINATION LACKS FOUNDATION. (STATE 1, PRP 1)

EPA'S RESPONSE: EPA BELIEVES THAT GROUND WATER ARARS SHOULD REMAIN WITH OU2 AND SUPPORTS THE STATE OF UTAH'S POSITION THAT GROUND WATER CONTAMINATION IS AN IMPORTANT ISSUE. A GROUND WATER REPORT IS AVAILABLE IN THE REMEDIAL INVESTIGATION ADDENDUM TO EXPLAIN WHAT IS HAPPENING IN THE GROUND WATER BELOW THE TAILINGS, UPGRADIENT, AND DOWNGRADIENT FOR OU1.

D. GROUND WATER CONCERNS

D.1 COMMENT: BOTH ON-SITE AND OFF-SITE GROUND WATER SHOULD BE PROTECTED. ALTERNATIVE NOS. 2 AND 4 FAIL TO DO THIS. (TRANSCRIPT 6, 13, 14, 15, LETTER 1)

EPA'S RESPONSE: THE OU1 GROUND WATER/GEOCHEMISTRY DATA AND INTERPRETATION REPORT IS AVAILABLE FOR PUBLIC REVIEW IN THE REMEDIAL INVESTIGATION ADDENDUM. THIS REPORT IS THE RESULT OF THE WATER WELL DRILLING AND SUBSURFACE INVESTIGATIONS CONDUCTED THIS PAST WINTER, AND THE USE OF WATER AND SOILS DATA FROM WELLS THAT HAVE BEEN INSTALLED OVER THE PAST FEW YEARS. GROUND WATER CONDITIONS UNDERLYING OU2 WERE NOT INVESTIGATED FURTHER DURING THE RECENT REMEDIAL INVESTIGATION.

E. SOILS CONCERNS

E.1 COMMENT: HOW WILL REMEDIATION OF FUTURE GARDENS BE HANDLED, HOW WILL EPA ESTABLISH BOUNDARIES FOR TESTING GARDENS, AND HOW WILL EPA ASSURE THAT NEW GARDENS ARE NOT CONSTRUCTED, UNLESS THEY MEET THE 200 PPM STANDARD? (TRANSCRIPT 7, 13, 17, STATE 1)

EPA'S RESPONSE: GARDENS ARE PRESENTLY TESTED IN AREAS WHERE THE SURROUNDING SOIL TESTS BETWEEN 200 AND 500 PPM LEAD. IF THE GARDEN TEST LEVEL IS ALSO BETWEEN 200 AND 500 PPM, THE SOIL WILL BE REPLACED WITH CLEAN GARDEN SOIL TO ADDRESS THE HAZARD OF CONSUMPTION OF VEGETABLES GROWN IN LEAD-CONTAMINATED SOIL.

THE ISSUE OF FUTURE GARDENS WILL BE ADDRESSED DURING REMEDIAL DESIGN. AT THAT TIME, EPA, THE STATE OF UTAH, AND THE CITY OF MIDVALE WILL DETERMINE WHICH AGENCY WILL BE RESPONSIBLE FOR FUTURE GARDENS IN THE MIDVALE AREA. IT IS CONTEMPLATED THAT INSTITUTIONAL CONTROLS WILL BE IMPLEMENTED FOLLOWING COMPLETION OF THE REMEDIAL ACTION. THE SPECIFIC CONTROLS WILL BE DEVELOPED DURING REMEDIAL DESIGN, AND WOULD BE EXPECTED TO PROTECT AGAINST FUTURE GARDENING IN CONTAMINATED SOILS.

E.2 COMMENT: IS THERE A PROCEDURE FOR TESTING HOUSE DUST IN HOMES? (STATE 1)

EPA'S RESPONSE: FOLLOWING OUTDOOR CLEANUP, EACH HOUSE WILL BE TESTED TO DETERMINE IF THE HOUSE DUST EXCEEDS THE ACTION LEVELS FOR LEAD AND ARSENIC. IF THE ACTION LEVELS ARE EXCEEDED, THE HOUSE WILL BE CLEANED.

E.3 COMMENT: SOIL SAMPLING SHOULD CONTINUE OVER THE 30-YEAR LIFE OF THE PROJECT. (TRANSCRIPT 4)

EPA'S RESPONSE: SOIL SAMPLING WILL CONTINUE UNTIL REMEDIAL ACTION HAS BEEN COMPLETED. EPA WILL THEN CONDUCT STUDIES EVERY FIVE YEARS FOR THE NEXT 30 YEARS. WHEN A FIVE-YEAR REVIEW DETERMINES THAT REMEDIATION HAS BEEN EFFECTIVE, SOIL SAMPLING WILL BE DISCONTINUED.

E.4 COMMENT: EXCAVATION SHOULD GO TO A DEPTH OF 18 INCHES OVER THE WHOLE AREA. (TRANSCRIPT 8)

EPA'S RESPONSE: CONTAMINATED SOILS AND VEGETATION WILL BE REMOVED TO THE ACTION LEVELS OF 500 PPM LEAD AND 70 PPM LEAD. EPA BELIEVES, BASED ON THE SOIL REMEDIAL INVESTIGATION, THAT THE MAJORITY OF CONTAMINATION IS IN THE FIRST SIX INCHES OF SOIL. EPA PROPOSES SOIL TESTING AT DISCRETE DEPTH INTERVALS PRIOR TO ACTUAL REMEDIATION OF INDIVIDUAL PROPERTIES TO ESTABLISH THE DEPTH OF CONTAMINATION ON A LOCATION SPECIFIC BASIS AND THEREFORE REDUCE UNNECESSARY EXCAVATION.

E.5 COMMENT: THE RELEASE OF FUGITIVE DUST FROM VARIOUS ACTIVITIES AT MINING SITES, INCLUDING EROSION, TRIGGERS ABATEMENT REQUIREMENTS, AND THE DESCRIPTION OF FUGITIVE DUST REQUIREMENTS NEEDS TO BE CLARIFIED. (STATE 1)

EPA'S RESPONSE: SAFE LEVELS FOR FUGITIVE DUST ARE DETERMINED BY THE AMBIENT AIR QUALITY STANDARDS FOR LEAD AND THE STATE STANDARDS FOR FUGITIVE DUST. LEAD CONTAINED IN FUGITIVE DUST IS A CRITERION-POLLUTANT UNDER THE NATIONAL AMBIENT AIR QUALITY STANDARDS. THE STANDARD FOR LEAD IS 1.3 (UG/M3) AS A THREE-MONTH AVERAGE. THE STATE'S STANDARDS FOR FUGITIVE DUST ARE LISTED IN THE UTAH ADMINISTRATIVE CODE (R446-1-4.5). THOUGH THERE IS NO SPECIFIC ACTION LEVEL, THE STANDARDS REQUIRE MINIMIZATION OF FUGITIVE DUST USING "BEST AVAILABLE CONTROL TECHNOLOGY." IN ADDITION, THE STANDARD FOR TOTAL SUSPENDED PARTICULATES WILL BE USED AS A TRIGGER FOR ABATEMENT REQUIREMENTS.

F. IMPLEMENTATION ISSUES

F.1 COMMENT: EPA SHOULD DETERMINE THE FINAL DISPOSITION OF RESIDENTIAL SOILS AT THE SAME TIME IT MAKES A FINAL DECISION ON OUI, INSTEAD OF TEMPORARILY STORING THE SOIL ON OUI. REMOVING RESIDENTIAL SOILS BY PLACING THEM ON THE TAILINGS IS UNECONOMICAL AND SCIENTIFICALLY UNNECESSARY. THE TAILINGS PLACED ON THE MILL SITE WILL STILL HAVE TO BE REMEDIATED. (TRANSCRIPT 1, 3, 4, 9, 11, 12, 13, 14, 15, LETTER 2, 3)

EPA'S RESPONSE: EPA DIVIDED THE SHARON STEEL SITE INTO TWO OPERABLE UNITS IN ORDER TO CONCENTRATE ON THE MORE IMMEDIATE NEED TO REMOVE THE SOIL FROM THE RESIDENTIAL AREAS, BEFORE ADDRESSING THE TAILINGS. THE PROPOSED PLAN FOR REMOVING CONTAMINATED RESIDENTIAL SOILS AND TEMPORARILY STORING THEM ON THE MILL SITE IS A PART OF A TOTAL REMEDY FOR THE SHARON STEEL SUPERFUND SITE. CONTAMINATED SOILS WILL BE STORED NEXT TO THE TAILINGS IN A TEMPORARY HOLDING FACILITY, SO THAT 1) THEY WOULD NOT CONTAMINATE GROUND WATER SUPPLIES; 2) THEY WOULD NOT BECOME AIRBORNE AND RECONTAMINATE NEARBY SOILS AREAS THAT ARE DEAN; AND 3) THEY WOULD NOT MIX WITH THE TAILINGS. SUCH DETAILS ARE FINALIZED DURING REMEDIAL DESIGN AND AS A PART OF THE DESIGN, PUBLIC HEARINGS AND A PUBLIC INVOLVEMENT PROCESS TAKE PLACE. PLACING THESE SOILS ON OUI MAY ALLOW THE USE OF AN INNOVATIVE TECHNIQUE IN TREATING THE SOILS, AND WILL CERTAINLY AFFORD ECONOMIES OF SCALE.

F.2 COMMENT: MIDVALE RESIDENTS ARE A PART OF UNINCORPORATED AND INCORPORATED SALT LAKE COUNTY. SALT LAKE COUNTY SHOULD, THEREFORE, BE INCLUDED AMONG THE REGULATORY AGENCIES WHOSE PERMISSION IT WOULD BE NECESSARY TO OBTAIN PRIOR TO DISPOSAL OF CONTAMINATED SOIL. (TRANSCRIPT 2, STATE 1)

EPA'S RESPONSE: EPA ACKNOWLEDGES THAT SALT LAKE COUNTY SHOULD BE CONSULTED ON THESE ISSUES.

F.3 COMMENT: THERE NEEDS TO BE MORE CLARIFICATION ON WHAT OPTIONS RESIDENTS WOULD HAVE CONCERNING RELOCATION DURING REMEDIAL CONSTRUCTION. INDIVIDUALS WHO HAVE PARTICULAR DIETARY, EQUIPMENT, OR PERSONAL ASSISTANCE NEEDS, FOR EXAMPLE, NEED SPECIAL HANDLING. (STATE 1)

EPA'S RESPONSE: EPA CONCURS AND WILL TAKE THIS INTO CONSIDERATION DURING REMEDIAL DESIGN.

F.4 COMMENT: REMEDIAL ACTIONS ON RESIDENTIAL SOILS MAY POSE A GREATER RISK THAN THE ONE ALREADY POSED, AND IT MAY NOT RESULT IN A PERMANENT SOLUTION. (TRANSCRIPT 15)

EPA'S RESPONSE: EPA BELIEVES THAT THE REMEDIAL INVESTIGATION STUDIES AND ANALYSES CONDUCTED OVER THE PAST FEW YEARS INDICATE THAT THERE ARE HEALTH AND ENVIRONMENTAL RISKS DUE TO EXPOSURE TO THE TAILINGS, WHICH REQUIRE REMEDY. THE STUDIES CONDUCTED IN ORDER TO DETERMINE SAFE ACTION LEVELS ALSO TAKE INTO ACCOUNT WHETHER OR NOT

THE SOLUTION ITSELF WOULD ADVERSELY ENDANGER PUBLIC HEALTH, WHETHER IT WOULD BE ECONOMICALLY FEASIBLE, AND WHAT THE LEVEL OF PERMANENCE WOULD BE. EPA BELIEVES THE REMEDY MEETS NECESSARY PUBLIC HEALTH PRECAUTIONS, IS COST EFFECTIVE, AND IS INTENDED TO RESULT IN PERMANENT CLEANUP.

F.5 COMMENT: IT IS ASSUMED THAT THE REMEDIAL PLAN WILL NOT APPLY TO RAILROAD OPERATING PROPERTY. (LETTER 4)

EPA'S RESPONSE: REMEDIAL ACTION ON RAILROAD OPERATING PROPERTY WILL BE DETERMINED DURING REMEDIAL DESIGN.

F.6 COMMENT: WILL THE PUBLIC BE ABLE TO COMMENT ON ANY FUTURE DECISIONS THAT MAY AFFECT THEIR INTERESTS IN THE SITE? (TRANSCRIPT 2)

EPA'S RESPONSE: YES. AS A PART OF THE REMEDIAL DESIGN FOR OU2, FOR EXAMPLE, THERE IS A PUBLIC INVOLVEMENT PROCESS.

F.7 COMMENT: IS THERE A DEFINITE TIMETABLE FOR THE DECISION ON MILL TAILINGS? (TRANSCRIPT 3)

EPA'S RESPONSE: THE PLAN IS TO COMPLETE IN DRAFT FORM THE FEASIBILITY STUDY AND THE PROPOSED PLAN, WHICH ARE UNDERWAY FOR OUT REGARDING THE MILL TAILINGS AND GROUND WATER, IN OCTOBER, 1990. THE PLAN IS THEN TO PREPARE THE RECORD OF DECISION FOR OU1 BY MARCH, 1991.

F.8 COMMENT: EPA NEEDS TO ADDRESS THE VARIOUS COMMENTS MADE REFERRING TO TYPOGRAPHICAL ERRORS, REWORDING OF SENTENCES, FORMING DEFINITIONS OF ACRONYMS, AND ADDING MORE DETAILED AND FURTHER EXPLANATIONS OF THE TEXT. (STATE 1, TRANSCRIPT 12)

EPA'S RESPONSE: EPA HAS NOTED THE NUMEROUS EDITORIAL COMMENTS BY THE STATE AND, IN GENERAL, ACKNOWLEDGES THEIR VALIDITY. NO REISSUANCE OF THIS RESPONSIVENESS SUMMARY IS ANTICIPATED HOWEVER. THE PREVIOUS DRAFT DOCUMENTS, COUPLED WITH THIS RESPONSIVENESS SUMMARY, CONSTITUTE THE FINAL REPORT.

F.9 COMMENT: THE PRPS REQUEST THAT ALL WRITTEN AND ORAL COMMENTS RELATING TO THE DEVELOPMENT OF THE REMEDIAL INVESTIGATION ADDENDUM AND THE FEASIBILITY STUDY PRESENTED AT PUBLIC MEETINGS AND SUBMITTED TO THE TECHNICAL ADVISORY COMMITTEE SHOULD BE INCORPORATED INTO THE ADMINISTRATIVE RECORD. (PRP 1)

EPA'S RESPONSE: SUCH DOCUMENTS WILL BE CONSIDERED IN THE SITE REMEDIATION PLANNING AND ARE MADE PART OF THE ADMINISTRATIVE RECORD.

G. COST ISSUES

G.1 COMMENT: WHY DOES THE NO ACTION ALTERNATIVE HAVE COSTS ASSOCIATED WITH IT? (TRANSCRIPT 13)

EPA'S RESPONSE: SINCE THE CONTAMINATION FROM THE TAILINGS WOULD REMAIN WITH THE NO ACTION ALTERNATIVE, IT IS NECESSARY AND PRUDENT FOR EPA AND THE STATE TO CONTINUE TO MONITOR SOILS CONTAMINATION TO ASCERTAIN IF INCREASES IN METAL LEVELS MAY BE OCCURRING OVER THE YEARS, DUE TO CONTAMINATED WIND-BLOWN TAILINGS.

G.2 COMMENT: FUNDS SHOULD BE ESCROWED TO DEFRAY THE ADDED COSTS TO REPLACE OR REPAIR DAMAGE DONE TO PROPERTY AND ROADWAYS DURING REMEDIATION, AND FOR DISPOSING OF AND REPLACING CONTAMINATED SOIL AFTER THE REMEDY HAS BEEN IMPLEMENTED AND INSTITUTIONAL CONTROLS ARE IN PLACE. (TRANSCRIPT 1, 2, 8, 15)

EPA'S RESPONSE: DURING REMEDIAL DESIGN FOR THE SELECTED ALTERNATIVE, EPA WILL DETERMINE THE APPROPRIATENESS OF THESE COSTS TO ADDRESS THESE ISSUES.

H. ECONOMIC ISSUES

H.1 COMMENT: WILL THE INSTITUTIONAL CONTROLS ON EXCAVATION INCREASE THE COSTS OF BUILDING AND/OR MAINTAINING HOMES AND THEREBY DECREASE THE VALUE OF PROPERTY IN THE AREA? (TRANSCRIPT 7, 16, STATE 1, LETTER 2)

EPA'S RESPONSE: REMEDIATION, IF PROPERLY UNDERTAKEN, SHOULD INCREASE THE VALUE OF PROPERTIES.

IT IS DIFFICULT TO ESTIMATE WHETHER OR NOT THERE WILL BE ADDITIONAL COSTS ASSOCIATED WITH FUTURE CONSTRUCTION. ADDITIONAL PRECAUTIONS ARE PLANNED TO PROTECT FUTURE RESIDENTS FROM PAST CONTAMINATION.

INSTITUTIONAL CONTROLS ARE ALSO DISCUSSED IN THE PROPOSED PLAN AS A MEANS OF PROTECTING HOME CONSTRUCTION WORKERS, REMODELERS, AND LANDSCAPERS FROM CONTAMINATED SOILS OR FROM CONTAMINATED FILL MATERIALS THAT MAY HAVE BEEN USED AS A BASE FOR THOSE SIDEWALKS. THOSE MATERIALS NEED TO BE HANDLED DIFFERENTLY BECAUSE THEY MAY LATER RECONTAMINATE AN AREA THAT IS "CLEAN."

I. ISSUES RELATED TO REMEDIAL ALTERNATIVES

I.1 COMMENT: AN ALTERNATIVE FOR HANDLING THE MIDVALE TAILINGS BY SLURRYING AND PUMPING WOULD BE PROHIBITIVELY EXPENSIVE. (LETTER 3)

EPA'S RESPONSE: EPA AGREES THAT SLURRYING AND PUMPING DOES NOT APPEAR TO BE ECONOMICALLY FEASIBLE, BUT WILL INVESTIGATE THIS ISSUE FURTHER IN THE OU1 FEASIBILITY STUDY.

I.2 COMMENT: AN ALTERNATIVE PLAN USING A HYDRAULIC SYSTEM TO CLEAN AND FLUSH THE SOILS AND RETURN THE USED WATER TO THE MILL SITE FOR PROCESSING SHOULD BE CONSIDERED FOR REMEDIATING OU2: (TRANSCRIPT 15)

EPA'S RESPONSE: THOUGH EPA CONSIDERED A TREATMENT TECHNOLOGY, EPA HAS CHOSEN ANOTHER ALTERNATIVE. EPA'S RATIONALE FOR ITS SELECTED ALTERNATIVE IS DETAILED IN THE RECORD OF DECISION, ENDANGERMENT ASSESSMENT, AND VARIOUS OTHER STUDIES DONE ON OU2.

I.3 COMMENT: THE NO ACTION ALTERNATIVE SHOULD BE TAKEN BECAUSE 90 PERCENT OF THE LEAD IN SOILS IS FROM SLAG, WHICH OCCURS IN SILICATE FORM AND WHICH IS INSOLUBLE IN HUMAN GASTRIC ACIDS. THE HEAVY METALS PRESENT IN THE MIDVALE TAILINGS ARE PRESENT AS INSOLUBLE COMPOUNDS. LEFT IN PLACE, THE SOIL HAS NO DEMONSTRATED EFFECT UPON PUBLIC HEALTH. (PRP 2, LETTER 3)

EPA'S RESPONSE: EPA BELIEVES THAT THE STUDIES CITED CANNOT BE DIRECTLY EXTRAPOLATED TO SOLUBILITY IN HUMAN GASTRIC ACIDS. EPA IS CURRENTLY CONDUCTING STUDIES DESIGNED TO GIVE A MORE ACCURATE MEASURE OF SOLUBILITY IN THE HUMAN STOMACH. EPA BELIEVES, FROM REMEDIAL INVESTIGATION STUDIES AND ANALYSES CONDUCTED OVER THE PAST FEW YEARS, THAT WIND-BLOWN MILL TAILINGS COMPRISE A MAJOR PORTION OF THE CONTAMINATION AT OU2. IT IS IMPRACTICAL TO SEPARATE THE WINDBLOWN MILL TAILINGS FROM TAILINGS THAT HAVE BEEN PHYSICALLY IMPORTED, OTHER SLAG MATERIALS, LEAD FROM AUTO EXHAUST, AND OTHER POTENTIAL SOURCES OF CONTAMINATION ON OU2. THEREFORE, THE SITE REMEDY WILL ADDRESS ALL SUCH ISSUES, WITH THE UNDERSTANDING THAT MILL TAILINGS HAVE PREDOMINANTLY CONTAMINATED THIS AREA.

EPA BELIEVES THAT THE CONTAMINATION ON OU2 PRESENTS HEALTH AND ENVIRONMENTAL RISKS, AND CONSIDERATION MUST BE GIVEN TO THE ALTERNATIVES WHICH PROTECT HUMAN HEALTH AND THE ENVIRONMENT. THE NO ACTION ALTERNATIVE DOES NOT MEET THE CRITERIA AND IS NOT COST EFFECTIVE, SINCE IT DOES NOT REDUCE TOXICITY, MOBILITY, OR VOLUME OF THE CONTAMINANTS.

I.4 COMMENT: IN ALTERNATIVE NO. 5, WILL THE WASHED SOILS THAT REMAIN BE NON-TOXIC, OR WOULD THEY STILL HAVE ABOVE-BACKGROUND LEVELS OF CONTAMINATION REQUIRING APPROPRIATE DISPOSAL? (STATE 1)

EPA'S RESPONSE: THE WASHED SOILS WILL BE NON-TOXIC, AS THIS ALTERNATIVE IS PLANNED TO REDUCE TOXICITY AND MOBILITY. HOWEVER, THE WASHED SOIL COULD HAVE METAL LEVELS ABOVE BACKGROUND LEVELS. IF ALTERNATIVE NO. 5 HAD BEEN SELECTED, FURTHER BENCH AND PILOT SCALE TESTS DURING REMEDIAL DESIGN WOULD DETERMINE PREDICTED SOIL CONCENTRATIONS FOLLOWING REMEDY.

I.5 COMMENT: HOW PRACTICAL IS THE ALTERNATIVE TO USE A GEOTEXTILE TO PREVENT EXCAVATION OF CONTAMINATED SOIL? (TRANSCRIPT 4, STATE 1)

EPA'S RESPONSE: EPA BELIEVES IF THE GEOTEXTILE HAD BEEN USED, IT WOULD PRESENT AN EFFECTIVE VISUAL AND PARTIALLY EFFECTIVE PHYSICAL BARRIER. THIS TECHNIQUE HAS BEEN USED SUCCESSFULLY AT ANOTHER SUPERFUND SITE.

I.6 COMMENT: ALTERNATIVE NO. 1, THE NO ACTION ALTERNATIVE, OR A "HOT SPOTS" ALTERNATIVE (WHICH WOULD BE A VARIATION OF ALTERNATIVE NO. 3, WITH REMOVAL OF SOILS IN EXCESS OF 3000 PPM LEAD AND 700 PPM ARSENIC, INSTEAD OF 500 PPM LEAD AND 200 PPM ARSENIC) ARE MORE COST EFFECTIVE THAN THE OTHER ALTERNATIVES. ALTERNATIVE NOS. 2 THROUGH 5 ARE ENVIRONMENTALLY AND FINANCIALLY UNJUSTIFIABLE AND MAY ACTUALLY ADVERSELY AFFECT PUBLIC HEALTH MORE THAN IF THE CONTAMINATION IS LEFT IN PLACE. (PRP 1)

EPA'S RESPONSE: EPA DOES NOT BELIEVE THAT THE NO ACTION ALTERNATIVE MEETS THE CLEANUP CRITERIA. IT IS NOT COST EFFECTIVE, IT DOES NOT REDUCE EXPOSURE TO THE TAILINGS, IT DOES NOT MEET AIR OR WATER RELEASE STANDARDS, AND IT DOES NOTHING TO BE PROTECTIVE IN THE LONG-TERM OR SHORT-TERM.

EPA BELIEVES THAT CONTAMINATION WITHIN THE 500 PPM LEAD LINE IS SO WIDESPREAD AS TO REQUIRE GENERAL FEASIBILITY STUDY COSTING FOR REMOVAL OF ALL OF THESE AREAS. IT IS LIKELY THAT, DURING REMEDIAL DESIGN, THE SCOPE OF ACTUAL CLEANUP ACTIVITIES WILL BE NARROWED BY VIRTUE OF FINDING CLEAN AREAS WITHIN THE LINE.

J. REMAINING CONCERNS

EPA BELIEVES THERE IS NO REASON FOR FURTHER DELAY ON OU2; THE SOILS IN OU2 CAN BE REMOVED FROM DIRECT CONTACT WITH THE POPULATION WHILE A REMEDY IS BEING SELECTED, DESIGNED, AND IMPLEMENTED AT OU1. THE COMMENTS IN THIS SECTION WILL, THEREFORE, BE MORE FULLY ADDRESSED AFTER COMPLETION OF THE OU1 STUDIES.

J.1 COMMENT: REPROCESSING THE TAILINGS WOULD BE IMPRACTICAL BECAUSE THERE IS LITTLE OR NO RECOVERABLE METAL LEFT IN THEM. (TRANSCRIPT 4, LETTER 3)

EPA'S RESPONSE: THIS ISSUE IS BEING STUDIED UNDER OU1. EPA HAS HEARD THIS CONCERN AND WILL RESPOND TO IT AFTER IT COMPLETES THE OU1 FEASIBILITY STUDY, AND PERHAPS, FURTHER REMEDIAL DESIGN STUDIES.

J.2 COMMENT: MIXING THE RESIDENTIAL SOILS WITH THE TAILINGS MAY MAKE IT IMPOSSIBLE TO REPROCESS THE TAILINGS. (TRANSCRIPT 1, 4, 11, 12, 15)

EPA'S RESPONSE: IN THE OU2 RECORD OF DECISION, EPA HAS CLARIFIED THIS MATTER BY INDICATING THAT THE CONTAMINATED SOILS WILL BE STORED SEPARATELY FROM, BUT ADJACENT TO, THE TAILINGS. EACH PILE CAN THEREFORE BE HANDLED SEPARATELY, IF NECESSARY, IF REPROCESSING IS CHOSEN FOR OU1.

J.3 COMMENT: CAN THE REPROCESSING PROPOSAL BIDS BE RELEASED TO OTHER PARTIES? (TRANSCRIPT 12)

EPA'S RESPONSE: THE PORTIONS OF THE PROPOSALS WHICH ARE NOT CONFIDENTIAL CAN BE RELEASED UPON REQUEST.

J.4 COMMENT: CAPPING THE TAILINGS WOULD HAVE AN UNACCEPTABLE IMPACT ON GROUND WATER IN THE SALT LAKE VALLEY. (LETTER 1)

EPA'S RESPONSE: EPA'S RECENT GROUND WATER INVESTIGATION INDICATES THAT A CAP WILL IMPROVE GROUND WATER QUALITY UNDER OU1.

J.5 COMMENT: A CAP IS THE ONLY REASONABLE AND ECONOMIC WAY TO RESOLVE THE TAILINGS PROBLEM AND PROTECT GROUND WATER. THERE IS NO CREDIBLE SCIENTIFIC EVIDENCE THAT THE INSOLUBLE HEAVY METAL OXIDES, SULFIDES, AND SILICATES CAN BE INGESTED BY THE HUMAN BODY OR ASSIMILATED BY VEGETATION GROWING IN THE SOIL. (TRANSCRIPT 5; 14, LETTER 3)

EPA'S RESPONSE: EPA BELIEVES THAT THE CONTAMINATION ON OU2 DOES PRESENT HEALTH RISKS, ITS STUDIES HAVE MODELED SOLUBILITY IN HUMAN GASTRIC ACID.

J.6 COMMENT: EPA SHOULD CONSIDER INNOVATIVE TECHNOLOGIES FOR SITE RECLAMATION, SUCH AS: USING A WASTE WATER TREATMENT TECHNOLOGY DEVELOPED AT PENNSYLVANIA STATE UNIVERSITY, CONSTRUCTING A BERM TO PROTECT THE JORDAN RIVER, OR PLANNING A WASTE WATER SPRAY IRRIGATION SYSTEM THAT WILL OPERATE ON A LOCAL GOLF COURSE. IN ADDITION, THE OLD CONCENTRATOR BUILDING WOULD BE AN IDEAL SITE FOR A SCIENCE AND MINING MUSEUM. (TRANSCRIPT 14, LETTER 3)

EPA'S RESPONSE: THIS ISSUE IS BEING STUDIED UNDER OU1.

J.7 COMMENT: THE APPROACH TO BE USED FOR SETTING CLEANUP GOALS FOR OU1 MUST BE MORE CLEARLY DEVELOPED. IN ADDITION, EPA SHOULD STATE MORE CLEARLY WHAT SIGNIFICANT SITE DIFFERENCES DISTINGUISH OFF-SITE DISPOSAL AT SHARON STEEL SITE FROM THE VITRO SITE. (STATE 1)

EPA'S RESPONSE: THIS ISSUE IS BEING STUDIED UNDER OU1.

J.8 COMMENT: THIS ISSUE HAS BEEN AROUND SINCE 1986; WHY IS IT TAKING SO LONG TO ADDRESS? (TRANSCRIPT 7)

EPA'S RESPONSE: EPA MUST FOLLOW THE CERCLA/SARA GUIDELINES FOR CLEANUP OF A SUPERFUND SITE. OFTEN, THE STUDIES, ANALYSES, PUBLIC COMMENT PERIODS, AND OTHER TECHNICAL AND PROCEDURAL REQUIREMENTS INVOLVE A NUMBER OF YEARS BEFORE A FINAL DECISION CAN BE MADE.

J.9 COMMENT: THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR THE OU1 WILL REFLECT NEW INFORMATION CONCERNING THE THICKNESS OF ANY CONFINING LAYERS PRESENT IN THE GROUND WATER SYSTEM BENEATH THE SITE. THE INTERCONNECTED NATURE OF THE AQUIFER SHOULD ALSO BE CLARIFIED. THIS CLARIFICATION SHOULD INCLUDE THE FACT THAT THE AQUIFER IS AN ACTUAL DRINKING WATER SOURCE IN THE SALT LAKE VALLEY AND IS SUBJECT TO GROUND WATER STANDARDS THAT MAY VARY DEPENDING ON THE PORTION OF THE AQUIFER BEING CONSIDERED. (STATE 1)

EPA'S RESPONSE: THE POTENTIAL FOR GROUND WATER CONTAMINATION WILL BE ADDRESSED DURING OUT REMEDIAL DESIGN. EPA SUPPORTS THE STATE OF UTAH'S POSITION THAT GROUND WATER CONTAMINATION IN EITHER SHALLOW OR DEEP ZONES THROUGHOUT SALT LAKE VALLEY IS A VERY IMPORTANT ISSUE.

J.10 COMMENT: THE WATER QUALITY IN THE SHALLOW GROUND WATER MAY AFFECT THE FUTURE USE OF GROUND WATER IN THE MUNICIPAL WATER SYSTEM. IF INCREASED USE OF DEEP GROUND WATER IN THE VALLEY CAUSES A REVERSAL IN THE PREDOMINANTLY UPWARD GRADIENT IN THE GROUND WATER, THERE MAY BE A LIMITATION OF THE USE OF GROUND WATER TO MAINTAIN WATER QUALITY. (STATE 1)

EPA'S RESPONSE: EPA HAS CONDUCTED OUL STUDIES TO DETERMINE WHETHER THERE IS ANY GROUND WATER CONTAMINATION ASSOCIATED WITH THE SHALLOW AND DEEP AQUIFERS. THESE DATA INDICATE THAT CONTAMINATION IN THE UPPER SAND AND GRAVEL AQUIFER IS UNLIKELY TO AFFECT THE DEEP AQUIFER.

PART 2. TECHNICAL COMMENTS AND RESPONSES

THE TECHNICAL COMMENTS FOCUSED ON MORE COMPLICATED SCIENTIFIC AND LEGAL ISSUES THAT WERE RAISED, FOR THE MOST PART, BY THE POTENTIALLY RESPONSIBLE PARTIES (PRPS). MORE GENERALIZED VERSIONS OF SOME OF THESE COMMENTS HAVE BEEN PRESENTED IN PART 1. NOT ALL OF THE GENERAL QUESTIONS IN PART 1 HAVE A MORE COMPLICATED OR LEGAL COUNTERPART IN PART 2, HOWEVER.

TECHNICAL COMMENTS FOCUSED ON THE ADEQUACY OF EPA'S STUDIES, HEALTH RISKS AND ACTION LEVELS, AND SOILS CONCERNS. TWO TOPICS WERE THE FOCUS OF A SIGNIFICANT NUMBER OF THE PRPS' COMMENTS:

- ACCURACY OF THE KRIGING MODEL:

THE PRPS EXPRESSED CONCERN AS TO WHETHER OR NOT THE KRIGING MODEL COULD PRODUCE RELIABLE SOILS CONTAMINATION CONTOUR MAPS. THE PRPS ALSO FELT THAT THE KRIGING MODEL WAS NOT ACCURATE ENOUGH TO ALLOW DEVELOPMENT OF RELIABLE ESTIMATES OF SOIL VOLUMES AND SPATIAL DISTRIBUTION OF OFF-SITE SOILS. IN ADDITION, THE PRPS THOUGHT THE VARIABILITY OF HIGH CONCENTRATIONS OF HEAVY METALS RESULTED IN A SIGNIFICANT LEVEL OF UNCERTAINTY. EPA'S RESPONSE IS THAT THE KRIGING MODEL IS ADEQUATE TO MEET THE NEEDS OF THIS STUDY AND TO PROTECT MIDVALE RESIDENTS. EPA'S DETAILED RESPONSES TO THE KRIGING QUESTIONS ARE PRESENTED IN THE ADEQUACY OF STUDIES SECTION BEGINNING ON PAGE 28.

- BLOOD-LEAD LEVELS:

THERE WERE ALSO A SIGNIFICANT NUMBER OF COMMENTS RELATING TO ACTION LEVELS AND THE GASTROINTESTINAL ABSORPTION FACTOR. THE PRPS ALSO RAISED QUESTIONS AS TO THE ACCURACY OF THE PREDICTIONS MADE IN THE BASELINE RISK ASSESSMENT AND IN THE INTEGRATED UPTAKE/BIOKINETIC MODEL (IU/BK). EPA'S RESPONSE TO BLOOD-LEAD LEVEL COMMENTS IS THAT BLOOD-LEAD LEVELS DO NOT PROVIDE A FULL PICTURE OF THE POTENTIAL FOR EXPOSURE AND THEREFORE CANNOT BE USED BY THEMSELVES TO SET ACTION LEVELS. THESE RESPONSES ARE ALSO PRESENTED IN THE ADEQUACY OF STUDIES SECTION BEGINNING BELOW.

K. ADEQUACY OF STUDIES

GEOSTATISTICS/KRIGING/MAPPING

K.1 COMMENT: THE ISOCONCENTRATION LINES ON THE KRIGED CONTOUR MAPS ARE STATISTICALLY UNSUPPORTED BY THE DATA IN THE RI ADDENDUM AND ARE NOT ACCURATE ENOUGH TO ALLOW DEVELOPMENT OF RELIABLE ESTIMATES OF THE VOLUME OR SPATIAL DISTRIBUTION OF OFF-SITE SOILS CONTAINING LEAD, ARSENIC, AND CADMIUM AT ELEVATED LEVELS. BECAUSE THE DATA ARE SO VARIABLE, THE OBJECTIVE OF ESTIMATING CONTAMINATED SOIL VOLUMES ON CONTOUR LEVELS DEVELOPED USING KRIGING IS INACCURATE AND MISLEADING. (PRP-1)

EPA'S RESPONSE: THE DATA COLLECTED AND THE ANALYSES PERFORMED FOR MIDVALE AREA SOILS ARE SUFFICIENT TO PROVIDE RELIABLE ESTIMATIONS OF SPATIAL DISTRIBUTION AND CONTAMINATED SOIL VOLUME. THE TRUE ACCURACY OF THE SPATIAL DISTRIBUTION AND SOIL VOLUME ESTIMATES CAN ONLY BE ASSESSED DURING REMEDIAL DESIGN AND/OR REMEDIAL ACTION. HOWEVER, THE ESTIMATES PROVIDED IN THE RI ADDENDUM AND FEASIBILITY STUDY (FS) REPRESENT THE MOST RELIABLE AVERAGE AND UNBIASED ESTIMATES POSSIBLE BASED ON THE AVAILABLE DATA.

K.2 COMMENT: THE KRIGING METHODS USED IN THE RI ADDENDUM DO NOT PROVIDE MEANINGFUL RESULTS DUE TO THE LACK OF STATISTICAL CORRELATION IN THE DATA SET. (PRP-1)

EPA'S RESPONSE: RESULTS PRESENTED IN THE RI ADDENDUM INDICATE THAT STATISTICAL CORRELATION (OF LEAD, ARSENIC, AND CADMIUM CONCENTRATION WITH DISTANCE) EXISTS OVER THE MIDVALE RESIDENTIAL AREA.

K.3 COMMENT: THE USE OF THE KRIGING APPROACH TO ANALYZE A DATA SET REQUIRES SOME CORRELATION OVER DISTANCE. THE PRESENT DATA SET, WHICH EXHIBITS EXTREME VARIABILITY OVER SHORT DISTANCES, SUGGESTS THAT KRIGING IS NOT AN APPROPRIATE ANALYTICAL TOOL. (PRP-1)

EPA'S RESPONSE: THE RI ADDENDUM PROVIDES VARIOGRAMS WHICH INDICATE AN AVERAGE CORRELATION BETWEEN LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS AND DISTANCE BETWEEN SAMPLES. THE EXISTENCE OF THIS CORRELATION, AS INDICATED BY THE VARIOGRAMS, MAKES KRIGING THE OPTIMUM METHOD FOR ESTIMATING CONCENTRATIONS OF LEAD, ARSENIC, AND CADMIUM IN MIDVALE SOILS.

K.4 COMMENT: ALTHOUGH ELEVATED CONCENTRATIONS OF HEAVY METALS WERE FOUND IN SOME SAMPLES OF MIDVALE RESIDENTIAL SOILS, THE HEAVY METAL CONCENTRATIONS ARE EXTREMELY VARIABLE WITH RESPECT TO LOCATION. THIS

VARIABILITY RESULTS IN A HIGH LEVEL OF UNCERTAINTY IN ESTIMATING METALS CONCENTRATIONS. IN ADDITION, THE PRESENT DATA SET IS NOT SPATIALLY OR VERTICALLY WELL RELATED AND DOES NOT DESCRIBE GENERAL AREAS OF ELEVATED LEAD AND ARSENIC LEVELS IN OFF-SITE RESIDENTIAL SOILS. (PRP-1)

EPA'S RESPONSE: VARIOGRAMS PROVIDED IN THE RI ADDENDUM IDENTIFY AN AVERAGE TREND OF DECREASING VARIABILITY AS THE DISTANCE BETWEEN SAMPLE POINTS DECREASES. IN OTHER WORDS, SAMPLES SPACED CLOSER TOGETHER ARE MORE LIKELY TO HAVE SIMILAR CONCENTRATIONS THAN SAMPLES SPACED FARTHER APART. AN AVERAGE TREND ON A REGIONAL SCALE AGREES WITH A COMMON MECHANISM OF DEPOSITION. BECAUSE THIS IS AN AVERAGE TREND, IT WILL NOT HOLD IN EVERY CASE, AND THEREFORE LOCAL VARIABILITY MAY BE EXPECTED. THIS LOCAL VARIABILITY MAY RESULT FROM OTHER DEPOSITIONAL MECHANISMS, MECHANICAL DISTURBANCES, AND OR OTHER SOURCES OF CONTAMINATION, AND IS PRESENT AS AN OVERPRINT ON THE AVERAGE REGIONAL TREND. HOWEVER, THE AVERAGE TREND, SUGGESTIVE OF A COMMON MECHANISM OF DEPOSITION, IS STILL RECOGNIZABLE IN THE DATA. THE GEOSTATISTICAL ANALYSES PROVIDED IN THE RI ADDENDUM INDICATE THAT HIGHER CONCENTRATIONS OF LEAD, ARSENIC, AND CADMIUM ARE MORE LIKELY TO BE FOUND NEARER TO THE TAILINGS AND/OR SMELTER SITES. THE AVERAGE TREND IS THAT OF GRADUALLY DECREASING CONCENTRATIONS WITH DISTANCE EAST.

K.5 COMMENT: THE COEFFICIENT OF VARIANCE BETWEEN PAIRED SAMPLE POINTS AT ZERO DISTANCE APPEARS TO BE UNACCEPTABLY HIGH. (PRP-1)

EPA'S RESPONSE: CONCENTRATION VARIANCES FOR SAMPLES AT ZERO DISTANCE (THE NUGGET) MAY BE OBTAINED FROM THE VARIOGRAMS PROVIDED IN THE RI ADDENDUM. THIS VARIANCE IS COMPOSED OF TWO PRIMARY SOURCES OF UNCERTAINTY: (1) RANDOM VARIABILITY IN SOIL-LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS IN THE MIDVALE AREA (INHERENT UNCERTAINTY); AND (2) RANDOM VARIABILITY IN COLLECTION, PREPARATION AND ANALYTICAL METHODS (THE HUMAN FACTOR). THE RELATIVE IMPORTANCE OF THESE TWO VARIANCE COMPONENTS WILL CHANGE DEPENDING ON LOCATION (OR CONCENTRATION) IN THE MIDVALE AREA SOILS. THE RI ADDENDUM EVALUATES BOTH OF THESE VARIANCE COMPONENTS. IN AREAS OF HIGH CONCENTRATIONS, THE HUMAN FACTOR IS THE PREDOMINANT COMPONENT OF THE VARIANCE. CONVERSELY, IN AREAS OF LOW CONCENTRATION, INHERENT VARIABILITY IS THE PREDOMINANT COMPONENT

K.6 COMMENT: THE RI ADDENDUM STATES THAT THIS HIGH DEGREE OF UNCERTAINTY IS ACCOUNTED FOR IN THE KRIGING MODEL BY A HIGH NUGGET, AND THAT THE LEVEL OF UNCERTAINTY IS THUS QUANTIFIED. REGARDLESS WHETHER THE UNCERTAINTY CAN BE QUANTIFIED, THE DATA ARE SO INHERENTLY VARIABLE, THE VARIOGRAM MODELS FITTED TO THE DATA EXHIBIT SUCH A POOR FIT, AND THE RESULTING UNCERTAINTY IS SO GREAT, THAT THE CONTOUR LINES GENERATED FROM THE DATA CAN NOT BE REALISTICALLY PRESUMED TO REPRESENT THE CONCENTRATION OF HEAVY METALS IN THE MIDVALE AREA. (PRP-1)

EPA'S RESPONSE: THE UNCERTAINTY ANALYSIS PROVIDED IN THE RI ADDENDUM INDICATES THAT THE RESULTING CONTOUR MAPS ARE PRECISE ENOUGH TO ALLOW DETERMINATION OF CONTAMINANT TREND AND THUS ESTIMATION OF THE VOLUME OF CONTAMINATED SOILS. THE VARIOGRAM MODELS ARE FITTED TO THE DATA AS PRECISELY AS POSSIBLE. THE RESULTS INDICATE THAT THE CONTOUR MAPS WILL BE REALISTIC.

K.7 COMMENT: THE AUTHORS APPARENTLY INTEND THAT THE KRIGED ERROR MAPS BE USED TO ILLUSTRATE THE ACCURACY OF THE KRIGED CONTOUR MAPS. THIS INTENTION IS IMPLIED BY THE STATEMENT THAT "...THE RESULTING KRIGED STANDARD DEVIATIONS...QUANTIFY THE LEVEL OF UNCERTAINTY", AND THAT "THE MAPS MAY BE USED TO KENT THE UNCERTAINTY ASSOCIATED WITH ESTIMATING THE KRIGED CONCENTRATIONS..." (PRP-1)

EPA'S RESPONSE: THE RI ADDENDUM MAKES NO ATTEMPT TO DETERMINE THE ACCURACY OF THE RESULTING KRIGED CONTOUR MAPS. TRUE ACCURACY MUST BE DETERMINED DURING REMEDIAL DESIGN AND/OR REMEDIAL ACTION. ALL UNCERTAINTY ANALYSES PROVIDED IN THE RI ADDENDUM FOCUSED ON DETERMINATION OF THE PRECISION OF THE RESULTING KRIGED ESTIMATES.

K.8 COMMENT: COMPARISONS OF THE APPROPRIATE PAIRS OF FIGURES INDICATE THAT THE KRIGED ERROR IS ALMOST AS LARGE AS THE ESTIMATED CONCENTRATION OVER CONSIDERABLE PORTIONS OF THE STUDY AREA, AND IN SOME LOCATIONS THE KRIGED ERROR IS LARGER THAN THE ESTIMATED VALUE. (PRP-T)

EPA'S RESPONSE: THE KRIGED ERROR IS GENERALLY CONSTANT OVER THE MIDVALE AREA. IN AREAS OF HIGH CONCENTRATION ESTIMATES, THE RELATIVE UNCERTAINTY ERROR IS LOWER THAN IN AREAS OF LOW CONCENTRATION ESTIMATES. THIS CONDITION IS A NATURAL OUTCOME OF THE GEOSTATISTICAL PROCESS, IN THAT AREAS WITH HIGHER CONCENTRATION ESTIMATES ARE MORE CERTAIN TO BE ABOVE AN ACTION (THRESHOLD) LEVEL THAN AREAS WITH LOWER CONCENTRATION ESTIMATES. ON THE NORTH, EAST AND SOUTH PERIMETER OF THE MIDVALE AREA, CONCENTRATION ESTIMATES ARE LESS CERTAIN TO BE ABOVE THE ACTION LEVEL. FURTHER SAMPLING DURING REMEDIAL DESIGN/REMEDIAL ACTION WILL DETERMINE WHETHER PROPERTIES WITHIN THESE AREAS WILL REQUIRE REMEDIATION.

K.9 COMMENT: THE FACT THAT KRIGED ERROR MAPS ARE ONLY INCLUDED IN FOUR OF THE TEN KRIGED CONTOUR MAPS SUGGESTS THAT THE OTHERS MAY BE EVEN LESS ACCURATE. (PRP-1)

EPA'S RESPONSE: KRIGED ERROR MAPS WERE GENERATED FOR EACH ELEMENT AND FOR EACH DEPTH INTERVAL. ONLY THOSE FOR THE SURFACE (0-2 INCH) ARE PROVIDED IN THE RI ADDENDUM BECAUSE THESE ARE THE MOST CRITICAL FOR VOLUME AND

COST ESTIMATION IN THE FS. HOWEVER, THE KRIGED ERROR MAPS FOR THE DEEPER INTERVALS WERE EXAMINED AND FOUND TO BE SIMILAR TO THOSE PRODUCED FOR THE SURFACE. IN MOST CASES, THE KRIGED ERRORS FOR THE DEEPER INTERVALS WERE LOWER THAN THE KRIGED ERRORS FOR THE SURFACE, PRESUMABLY BECAUSE THE DEEPER SOILS ARE LESS DISTURBED THAN THE SURFACE SOILS.

K.10 COMMENT: BECAUSE THE KRIGED ERROR REPRESENTS ONLY ONE OF A NUMBER OF POTENTIAL SOURCES OF ERROR IN THE KRIGED CONTOUR MAPS, THE ACTUAL LEVEL OF ACCURACY OF THE ISOPLETHS IS LOWER THAN THAT SHOWN ON THE KRIGED ERROR MAPS. (PRP-1)

EPA'S RESPONSE: THE KRIGED ERROR REPRESENTS THE STANDARD DEVIATION OF THE KRIGED ESTIMATE. BECAUSE THE KRIGED ESTIMATES ARE BASED ON DATA WHICH INCLUDE UNCERTAINTIES DUE TO SEVERAL SOURCES (SAMPLE COLLECTION, SAMPLE PREPARATION, ANALYTICAL, AND INHERENT VARIABILITY), THE KRIGED ERRORS ARE INCLUSIVE OF ALL THESE UNCERTAINTIES.

K.11 COMMENT: THE AUTHORS ACKNOWLEDGE ONE ADDITIONAL SOURCE OF ERROR BY INCLUDING TWO DIFFERENT KRIGED CONTOUR MAPS FOR THE SURFACE (0-2 INCH) LEAD CONCENTRATION. THE ISOPLETHS ON THESE TWO MAPS ARE CONSIDERABLY DIFFERENT, AS ARE THE CORRESPONDING KRIGED ERROR MAPS; THESE DIFFERENCES ARE ATTRIBUTABLE TO THE USE OF DIFFERENT VARIOGRAM MODELS. (PRP-1)

EPA'S RESPONSE: THE TWO DIFFERENT KRIGED CONCENTRATION AND ERROR MAPS FOR THE LEAD 0-2 INCH DEPTH INTERVAL WERE INCLUDED IN THE RI ADDENDUM TO ILLUSTRATE THE AFFECT ON UNCERTAINTY OF ACCEPTING THE DOUBLE SPHERICAL MODEL OVER THE SPHERICAL MODEL. THE SINGLE SPHERICAL MODEL IS THOUGHT TO REPRESENT THE GENERAL TREND IN THE MIDVALE AREA. THIS TREND IS A LONG RANGE (REGIONAL) PATTERN OF DECREASING LEAD CONCENTRATION WITH DISTANCE AWAY FROM THE TAILINGS AND/OR SMELTER SITES. THE DOUBLE SPHERICAL MODEL ADDS A SECONDARY SHORT RANGE FEATURE. THE SECONDARY FEATURE REPRESENTS SMALLER POCKETS (OR CELLS) OF HIGHER LEAD CONCENTRATIONS SUPERIMPOSED ON THE REGIONAL PATTERN. THE RELATIVELY HIGHER KRIGED ERRORS ASSOCIATED WITH THE DOUBLE SPHERICAL MODEL INDICATE THAT THIS SECONDARY PATTERN IS LESS CERTAIN (AT THE CURRENT SAMPLE DENSITY) THAN THE REGIONAL PATTERN. THE KRIGED ERROR MAPS ARE DIFFERENT. HOWEVER, THE KRIGED CONCENTRATION MAPS ARE SIMILAR WITH RESPECT TO THE AERIAL EXTENT OF LEAD CONCENTRATIONS ABOVE 500 PPM. THEREFORE, VOLUME ESTIMATES OF CONTAMINATED SOIL WILL BE SIMILAR FOR THE TWO MAPS.

K.12 COMMENT: IT IS NOT POSSIBLE TO DETERMINE WHICH, IF EITHER, OF THESE TWO MODELS IS A BETTER REPRESENTATION OF THE ACTUAL DISTRIBUTION; IN FACT, IT MAY BE THAT NO VARIOGRAM MODEL WILL ACCURATELY REPRESENT THE TRUE DISTRIBUTION OF SOIL CONTAMINANTS AT THE SITE. INCLUSION OF TWO DIFFERENT MAPS FOR THE SURFACE LEAD CONCENTRATION ILLUSTRATES THAT ERRORS IN SPECIFYING THE VARIOGRAM MODEL ARE BOTH LIKELY AND POTENTIALLY IMPORTANT SOURCES OF ERROR IN THE KRIGED CONTOUR MAPS. ERRORS RESULTING FROM SELECTION OF AN INACCURATE (OR MISLEADING) MODEL ARE NOT REFLECTED IN THE KRIGED ERROR MAPS. (PRP-1)

EPA'S RESPONSE: IT IS BELIEVED THAT THE DOUBLE SPHERICAL MODEL WILL BE BORNE OUT BY ADDITIONAL SAMPLING TO BE CONDUCTED DURING REMEDIAL DESIGN/REMEDIAL ACTION. HOWEVER, AS ILLUSTRATED IN THE RI ADDENDUM, EITHER MODEL IS EQUALLY USEFUL AT THIS TIME TO ESTIMATE THE DISTRIBUTION AND VOLUME OF CONTAMINATED SOIL IN THE MIDVALE AREA. THE TWO MAPS ILLUSTRATE THAT EITHER MODEL WILL RESULT IN SIMILAR VOLUME ESTIMATES.

K.13 COMMENT: KRIGING DOES NOT PRODUCE RELIABLE OR USEFUL MAPS, AND THE KRIGED ERROR MAPS SHOULD NOT BE USED TO CHARACTERIZE THE UNCERTAINTY IN EXPECTED COSTS ASSOCIATED WITH VARIOUS REMEDIATION ALTERNATIVES IN THE FEASIBILITY STUDY. USE OF THE KRIGED ERROR MAPS FOR CHARACTERIZING THE UNCERTAINTY OF THE SOIL VOLUME ESTIMATES WILL LEAD TO A FALSE SENSE OF RELIABILITY IN THE RESULTING COST ESTIMATES. (PRP-1)

EPA'S RESPONSE: THE KRIGING TECHNIQUE IS WELL DOCUMENTED AND HAS BEEN USED AT OTHER SITES SIMILAR TO MIDVALE, INCLUDING OTHER SUPERFUND SITES WHERE SOILS HAVE BEEN CONTAMINATED WITH MINE TAILINGS AND/OR SMELTER EMISSIONS. THE KRIGED ERROR MAPS WERE EXAMINED TO EVALUATE THE POSSIBLE EFFECT ON RESULTING SOIL VOLUMES OF SELECTING ONE MODEL OVER THE OTHER. THE EVALUATION DETERMINED THAT EITHER MAP WOULD RESULT IN SIMILAR VOLUME ESTIMATES. THE UNCERTAINTY OF THE COST ESTIMATES DEVELOPED IN THE FS WERE THEREFORE NOT A FUNCTION OF THE KRIGED ERROR MAPS, AND WERE NOT USED FOR SUCH PURPOSE.

K.14 COMMENT: THE HIGH NUGGET EFFECTS OBSERVED FOR LEAD, ARSENIC, AND CADMIUM IN SEVERAL OF THE VARIOGRAMS OF APPENDIX C INDICATE THAT KRIGING OF THESE DATA WILL NOT YIELD RELIABLE OR USEFUL MAPS OF THE DISTRIBUTION OF THESE CONSTITUENTS. PARTICULARLY DISTURBING IS THE HIGH VARIANCE IN THE FIRST LAG INTERVAL ON SEVERAL OF THE VARIOGRAMS. (PRP-1)

EPA'S RESPONSE: THE VARIOGRAMS OF APPENDIX C OF THE RI ADDENDUM INCLUDE OMNIDIRECTIONAL VARIOGRAMS FOR DEEPER DEPTH INTERVALS AND DIRECTIONAL VARIOGRAMS (0, 45, 90, AND 135 DEGREE ORIENTATIONS) FOR ALL DEPTH INTERVALS. ALL OF THE OMNIDIRECTIONAL AND MOST OF THE DIRECTIONAL VARIOGRAMS INDICATE VARIANCES FOR NUGGETS WHICH ARE DISTINGUISHABLE FROM VARIANCES FOR OTHER SAMPLE PAIRS SPACED FURTHER APART. THE JUDGEMENT AS TO WHETHER THESE NUGGETS ARE "HIGH" IS SUBJECTIVE. HOWEVER, REGARDLESS OF WHETHER THE NUGGETS ARE HIGH, KRIGING HAS PRODUCED MAPS WHICH ARE USEFUL IN ESTIMATING THE DISTRIBUTION AND VOLUME OF CONTAMINATED SOIL IN THE MIDVALE AREA.

K.15 COMMENT: THE FIT OF THE MODEL VARIOGRAM TO THE DATA POINTS IN THE PLOTTED VARIOGRAM IS INADEQUATE IN SEVERAL CASES. (PRP-1)

EPA'S RESPONSE: THE MODELS WERE FITTED TO THE OMNIDIRECTIONAL VARIOGRAMS BECAUSE THESE ARE EXPECTED TO BEST REPRESENT THE REGIONAL PATTERN IN THE MIDVALE AREA. IN MOST CASES, THE OMNIDIRECTIONAL MODELS ALSO FIT WELL WITH THE DIRECTIONAL VARIOGRAMS, AS ILLUSTRATED BY THE VARIOGRAMS PROVIDED IN APPENDIX C. HOWEVER, FOR SPECIFIC ORIENTATIONS, THE OMNIDIRECTIONAL VARIOGRAMS ARE NOT WELL FITTED DUE TO AN INCREASE IN RANDOMNESS FOR THAT ORIENTATION. DIRECTIONAL VARIOGRAM MODELS WERE TRIED IN CERTAIN CASES; HOWEVER, OMNIDIRECTIONAL MODELS WERE DETERMINED TO BEST FIT THE DATA.

K.16 COMMENT: THE VARIOGRAMS ARE ONLY PLOTTED OUT TO 2000 FEET, MAKING IT DIFFICULT TO ASSESS THE FIT OUT TO A POSTULATED SILL AT 5000 FEET. (PRP-1)

EPA'S RESPONSE: VARIOGRAM MODELS WERE FITTED OUT TO BEYOND THE SILL IN ALL CASES. HOWEVER, BECAUSE KRIGING ESTIMATES WERE DETERMINED TO ONLY BE AFFECTED BY THE VARIOGRAM MODEL OUT TO LESS THAN 1000 FEET, IT WAS NOT FELT NECESSARY TO PLOT THE VARIOGRAMS OUT TO GREATER DISTANCES; I.E., THE SEARCH RADIUS USED IN THE KRIGING METHOD FOR THESE DATA WAS ESTABLISHED AT A RANGE OF 500 TO 1000 FEET. THUS, THE FIT OF THE MODEL TO THE VARIOGRAM BEYOND 1000 FEET WAS NOT CRITICAL TO THE RESULTING KRIGED ESTIMATES.

K.17 COMMENT: THE KRIGED ERROR MAPS UNDERESTIMATE THE ACTUAL LEVEL OF ERROR ASSOCIATED WITH THE KRIGED CONTOUR MAPS ON WHICH THE REMEDIATION COST ESTIMATES ARE BASED. THE ACCURACY OF THE COST ESTIMATES SHOULD BE ESTIMATED BY METHODS THAT ACCOUNT FOR ALL OF THE POTENTIAL SOURCES OF ERROR, NOT JUST THE KRIGED ERROR. (PRP-1)

EPA'S RESPONSE: THE KRIGED CONTOUR MAPS ARE SHOWN IN THE RI ADDENDUM TO BE UNBIASED ESTIMATORS OF CONTAMINANT CONCENTRATION IN THE MIDVALE AREA. THEREFORE, THE ERROR MAPS ARE ALSO UNBIASED. THE COST ESTIMATES IN THE FS ARE BASED ON AVERAGE COSTS ASSOCIATED WITH REMEDIATION TECHNOLOGIES. THE COSTS ARE NOT SENSITIVE TO ANY POTENTIAL KRIGING ERRORS.

K.18 COMMENT: ALL ERROR CONTRIBUTIONS WERE NOT CONSIDERED AND THESE ERRORS CONTRIBUTE TO THE INABILITY TO PREPARE RELIABLE MAPS. (PRP-1)

EPA'S RESPONSE: ALL PRIMARY ERROR COMPONENTS WERE EVALUATED.

K.19 COMMENT: THE USE OF TWO ANALYTICAL TECHNIQUES BY THE CONTRACT LABORATORY PROGRAM (CLP) CREATES DIFFICULTY IN SEPARATING THESE TWO CONTRIBUTIONS TO THE VARIANCE IN THE SAMPLE SET. (PRP-1)

EPA'S RESPONSE: THE UNCERTAINTIES DUE TO BOTH ANALYTICAL TECHNIQUES ARE INCLUDED IN THE TOTAL UNCERTAINTY. IT WAS NOT DEEMED NECESSARY TO SEPARATE THEM AT THIS TIME. THE BEST ANALYTICAL TECHNIQUE TO USE DURING REMEDIATION WILL BE EVALUATED DURING REMEDIAL DESIGN.

K.20 COMMENT: THE ICP-AES DATA HAVE A SIGNIFICANTLY LOWER PRECISION THAN THE GRAPHITE FURNACE ATOMIC ABSORPTION (GFAA) DATA. (PRP-1)

EPA'S RESPONSE: THE GFAA ANALYTICAL TECHNIQUE HAS A BETTER (LOWER) PRECISION THAN THE INDUCTIVELY COUPLED PLASMA (ICP) TECHNIQUE AT LOWER CONCENTRATION LEVELS. CONVERSELY, THE ICP TECHNIQUE HAS COMPARABLE OR BETTER PRECISION AT HIGHER CONCENTRATION LEVELS (DUE TO GFAA REQUIRING DILUTION OF HIGH CONCENTRATION SAMPLES PRIOR TO ANALYSIS). WHETHER THE PRECISION DIFFERENCE IS "SIGNIFICANT" IN TERMS OF REMEDIAL ACTION DECISIONS WILL BE EVALUATED DURING REMEDIAL DESIGN.

K.21 COMMENT: THE USE OF ANALYTICAL DATA WITH DIFFERENT PRECISION FURTHER COMPLICATES THE PREPARATION OF RELIABLE MAPS. (PRP-1)

EPA'S RESPONSE: THE GFAA TECHNIQUE WAS SELECTED FOR THOSE SAMPLES WITH LOW CONCENTRATIONS, AND ICP FOR HIGH CONCENTRATIONS, IN ORDER TO ACHIEVE THE BEST POSSIBLE ANALYTICAL PRECISION (AND MOST RELIABLE CONCENTRATION MAPS) AT ALL CONCENTRATION LEVELS.

K.22 COMMENT: AS DISCUSSED IN THE RI ADDENDUM, AN INCREASE IN SAMPLING DENSITY (A SAMPLE DENSITY OF 50 TO 75 FEET IS RECOMMENDED IN THE RI ADDENDUM) IS REQUIRED TO REALISTICALLY CHARACTERIZE THE RELATIONSHIP OF ANY METALS LEVELS IN THE MIDVALE SOILS. (PRP-1)

EPA'S RESPONSE: THE 50 TO 75 FOOT SAMPLE SPACING WAS AN ESTIMATE OF THE DENSITY REQUIRED TO CONFIRM THE PRESENCE OF THE SECONDARY SHORT RANGE FEATURE THAT APPEARS TO BE SUPERIMPOSED ON THE REGIONAL PATTERN OF LEAD CONCENTRATIONS IN THE MIDVALE AREA. THE CURRENT SAMPLING DENSITY IS SUFFICIENT TO CHARACTERIZE THE REGIONAL TREND OF CONTAMINANT DISTRIBUTION.

K.23 COMMENT: ATTEMPTS TO CHARACTERIZE HEAVY METAL CONTAMINATION BASED SOLELY ON A SITE-WIDE WIND-BLOWN TAILINGS DISPERSION PATTERN CONTRADICTS THE EXISTING SITUATION IN MIDVALE. (PRP-1)

EPA'S RESPONSE: A WIND-BORNE MECHANISM OF DEPOSITION WAS NOT ASSUMED IN THE GEOSTATISTICAL EVALUATION OF CONTAMINANT DISTRIBUTION. HOWEVER, THE RESULTING PATTERN BASED ON GEOSTATISTICAL EVALUATION IS CONSISTENT WITH THIS MECHANISM.

K.24 COMMENT: THE MAPPING PROCEDURE USED IN THIS INVESTIGATION IS NOT THE MOST APPROPRIATE TO THE PROBLEM BEING STUDIED. THE AUTHORS OF THE REPORT HAVE NOT PROVIDED SUFFICIENT JUSTIFICATION FOR USING THIS METHOD, NOR HAVE THEY PROVIDED ALL OF THE IMPORTANT DETAILS. (PRP-3)

EPA'S RESPONSE: THE MAPPING METHOD USED, ORDINARY BLOCK KRIGING, PROVIDES THE MOST RELIABLE AND UNBIASED ESTIMATES OF LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS POSSIBLE GIVEN THE NATURE OF CONTAMINATION IN THE MIDVALE RESIDENTIAL AREA. THIS MAPPING METHOD IS WELL DOCUMENTED IN THE LITERATURE AND HAS BEEN USED SUCCESSFULLY AT OTHER SITES, INCLUDING CERCLA SITES, WHICH ARE VERY SIMILAR TO MIDVALE. ALL OF THE DETAILS NECESSARY TO REPRODUCE THE RESULTING KRIGED CONCENTRATION MAPS ARE PROVIDED IN THE RI ADDENDUM.

K.25 COMMENT: IN DEVELOPING THE KRIGED CONTOUR MAPS, THE RI ADDENDUM USED A METHOD (ORDINARY BLOCK KRIGING) THAT IS BASED ON THE ASSUMPTION OF NO DRIFT (NO REGIONAL TREND). (PRP-3)

EPA'S RESPONSE: ORDINARY KRIGING IS BASED ON THE ASSUMPTION THAT THE PRESENCE OF THE REGIONAL TREND DOES NOT BIAS THE RESULTS OBTAINED WITH THE METHOD. IN OTHER WORDS, ORDINARY KRIGING MAY STILL BE USED, EVEN IN THE PRESENCE OF DRIFT, AS LONG AS THE DRIFT DOES NOT PERCEPTIBLY BIAS THE RESULTS.

K.26 COMMENT: IN THE PRESENCE OF A STRONG REGIONAL PATTERN (WHICH IS INDICATIVE OF SIGNIFICANT DRIFT), UNIVERSAL KRIGING IS A MORE APPROPRIATE METHOD THAN ORDINARY BLOCK KRIGING, BECAUSE UNIVERSAL KRIGING ACCOUNTS FOR THE DRIFT. FAILURE TO RECOGNIZE AND ACCOUNT FOR A SIGNIFICANT DRIFT WILL RESULT IN ERRONEOUS VARIOGRAM MODELS AND INACCURATE KRIGED ESTIMATES. (PRP-3)

EPA'S RESPONSE: EPA AGREES WITH THE PRPS THAT A TREND (OR DRIFT) EXISTS AT THE SITE, AS IDENTIFIED BY THE GEOSTATISTICAL RESULTS PROVIDED IN THE RI ADDENDUM. THIS TREND IS A PATTERN OF CONTAMINATION REFLECTED BY GENERALLY DECREASING SOIL-LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS WITH DISTANCE AWAY FROM THE TAILINGS AND/OR SMELTER SITES; I.E., A CORRELATION OF CONCENTRATION WITH DISTANCE.

UNIVERSAL KRIGING IS USEFUL WHEN THE TREND (OR DRIFT) CAN BE IDENTIFIED AS CAUSING BIAS IN THE RESULTING KRIGED ESTIMATES. BOTH TREND ANALYSES OF THE KRIGED RESIDUALS AND CROSS VALIDATION KRIGING TO DETERMINE WHETHER THE TREND MIGHT BE BIASING THE KRIGED ESTIMATES WERE PERFORMED. NEITHER ANALYSIS INDICATED THE PRESENCE OF BIAS. FURTHERMORE, IN ORDER TO APPLY UNIVERSAL KRIGING, THE DRIFT MUST NOT ONLY BE IDENTIFIED BUT ALSO QUANTIFIED. DRIFT COULD NOT BE QUANTIFIED FOR THE MIDVALE AREA DUE TO THE INHERENT VARIABILITY AT THE SITE. HOWEVER, EVEN IF A DRIFT COMPONENT COULD BE EXTRACTED FROM THE DATA, AND UNIVERSAL KRIGING WAS THEREFORE USED IN PLACE OF ORDINARY KRIGING, THE RESULTING CONCENTRATION CONTOUR MAPS WOULD BE ESSENTIALLY THE SAME AS THOSE PROVIDED IN THE RI ADDENDUM. THIS IS BECAUSE UNIVERSAL KRIGING IS ESSENTIALLY A REFINEMENT OF THE ORDINARY KRIGING METHOD ALREADY PERFORMED AND PRESENTED IN THE RI ADDENDUM; I.E., THE ONLY DIFFERENCE IS THAT UNIVERSAL KRIGING APPLIES A DRIFT CORRECTION TERM TO THE EQUATIONS USED TO MAKE THE KRIGING ESTIMATES. DRIFT CORRECTION WOULD NOT CHANGE THE RESULTING REGIONAL PATTERN, AND WOULD ONLY SLIGHTLY CHANGE KRIGED ESTIMATES ON A LOCAL SCALE.

K.27 COMMENT: THE RI ADDENDUM ATTEMPTS TO JUSTIFY THE USE OF ORDINARY BLOCK KRIGING THROUGH CROSS-VALIDATION, BUT SOME OF THE VITAL DETAILS OF THIS EXERCISE ARE MISSING. (PRP-3)

EPA'S RESPONSE: ALL OF THE DETAILS NECESSARY TO REPRODUCE THE KRIGING AND CROSS-VALIDATION ARE PROVIDED IN THE RI ADDENDUM, UNLESS THEY REPRESENT STANDARD PROCEDURES, WHICH MAY BE OBTAINED FROM THE SOFTWARE MANUAL.

K.28 COMMENT: IF THE CROSS-VALIDATION WAS PERFORMED WITH POINT KRIGING (WHICH SEEMS LIKELY BECAUSE THIS IS THE FORM PROVIDED BY THE GEO-EAS SOFTWARE), THE CROSS-VALIDATION DOES NOT DEMONSTRATE THAT THE BLOCK KRIGING WAS UNBIASED. (PRP-3)

EPA'S RESPONSE: CROSS VALIDATION REQUIRES THAT POINT KRIGING BE USED SINCE THE CROSS VALIDATION ESTIMATES ARE COMPARED TO THE ANALYTICAL RESULTS OF KNOWN SAMPLE POINTS. IT IS BELIEVED THAT THE RESULTS OF THE CROSS VALIDATION REFLECT THE DEGREE OF BIAS, OR LACK THEREOF, OF THE KRIGED ESTIMATES.

K.29 COMMENT: THE RI ADDENDUM FAILS TO SPECIFY WHETHER THE CROSS-VALIDATION EXERCISE USED ORDINARY KRIGING WITH THE SAME VARIOGRAM MODELS, SECTOR/QUADRANT SEARCH LIMITS, ETC. AS WERE USED IN DEVELOPING THE KRIGED CONTOUR MAPS. (PRP-3)

EPA'S RESPONSE: THIS IS STANDARD PRACTICE AND WAS NOT SPECIFIED IN THE RI ADDENDUM.

K.30 COMMENT: EVEN IF THE MAPS ARE NOT GLOBALLY BIASED, THERE IS STILL THE POSSIBILITY OF LOCAL BIAS. IF THE MAPS ARE BIASED NEAR THE ISOPLETHS THAT REPRESENT CLEANUP LEVELS, ESTIMATES OF THE VOLUME OF CONTAMINATED SOILS REQUIRING REMEDIATION WILL ALSO BE BIASED. (PRP-3)

EPA'S RESPONSE: NEITHER LOCAL NOR GLOBAL BIAS COULD BE DISTINGUISHED IN THE DATA. GLOBAL BIAS IS EXPECTED TO HAVE AN EVEN LESSER EFFECT ON KRIGED ESTIMATES THAN LOCAL BIAS.

K.31 COMMENT: A MAP SHOWING THE LOCATION AND MAGNITUDE OF THE CROSS-VALIDATION ERRORS CAN BE PRODUCED AUTOMATICALLY BY THE GEO-EAS SOFTWARE DURING THE CROSS-VALIDATION EXERCISE. EXAMINATION OF THESE MAPS WOULD ALLOW DETERMINATION OF WHETHER THE KRIGED ESTIMATES ARE BIASED IN THE REGION OF THE 500 MG/KG LEAD AND 70 MG/KG ARSENIC

ISOPLETHS. THESE MAPS HAVE NOT BEEN INCLUDED IN THE RI ADDENDUM, NOR HAVE ANY OTHER FIGURES THAT COULD BE USED TO DETERMINE THE PRESENCE OF LOCAL BIAS. (PRP-3)

EPA'S RESPONSE: CROSS-VALIDATION KRIGING WAS USED TO DETERMINE WHETHER THE KRIGING ESTIMATES MIGHT BE BIASED AS A RESULT OF DRIFT. THIS INCLUDED THE EXAMINATION OF ESTIMATION ERROR MAPS. THESE MAPS DID NOT INDICATE THE PRESENCE OF BIAS NEAR THE CLEANUP ACTION LEVEL, NOR AT ANY CONCENTRATION LEVEL PRESENT AT THE SITE. THESE ESTIMATION ERROR MAPS WERE NOT PROVIDED IN THE RI ADDENDUM BECAUSE IT WAS FELT THAT CONFIRMATION OF NO OVERALL BIAS WAS MOST IMPORTANT AND SUFFICIENT FOR PURPOSES OF THIS INVESTIGATION.

K.32 COMMENT: ONE OF THE UNSTATED REASONS FOR SELECTION OF SOME OF THE MAPPING PROCEDURES USED IN THIS STUDY IS THAT THE OPTIONS PROVIDED BY THE GEO-EAS SOFTWARE ARE LIMITED. ALTERNATIVE MAPPING METHODS SHOULD HAVE BEEN CONSIDERED, EVEN IF THIS REQUIRED THE USE OF OTHER SOFTWARE PACKAGES. (PRP-3)

EPA'S RESPONSE: ALTERNATIVE MAPPING METHODS WERE CONSIDERED. HOWEVER, THE PROCEDURES USED BY THE GEO-EAS SOFTWARE WERE DEEMED ADEQUATE FOR THIS INVESTIGATION.

K.33 COMMENT: THERE IS NO INDICATION IN THE RI ADDENDUM THAT ALTERNATIVES SUCH AS UNIVERSAL KRIGING OR TREND SURFACE ANALYSES WERE USED TO DEVELOP CONTOUR MAPS FROM THESE DATA. (PRP-3)

EPA'S RESPONSE: CONTOUR MAPS WERE NOT DEVELOPED USING ANY TECHNIQUES OTHER THAN THOSE DESCRIBED IN THE RI ADDENDUM.

K.34 COMMENT: WERE VARIOGRAM MODELS OTHER THAN SPHERICAL AND DOUBLE SPHERICAL TRIED? (PRP-3)

EPA'S RESPONSE: EXPONENTIAL AND LINEAR MODELS WERE ALSO FITTED TO THE VARIOGRAMS. BOTH PROVIDED ADEQUATE FITS OVER THE PORTIONS OF THE VARIOGRAMS OF PRIMARY CONCERN; I.E., OVER THE RANGES OF INTEREST. HOWEVER, THE SPHERICAL MODELS BETTER REPRESENTED THE OVERALL VARIOGRAMS.

K.35 COMMENT: WERE THE MODELS FITTED AFTER PLOTTING THE EXPERIMENTAL DATA AT A VARIETY OF LAG INTERVALS, AS RECOMMENDED IN THE GEO-EAS MANUAL? (PRP-3)

EPA'S RESPONSE: YES.

K.36 COMMENT: MANY OF THE ESSENTIAL DETAILS OF THE MAPPING PROCEDURE ARE NOT PROVIDED IN THE REPORT. (PRP-3)

EPA'S RESPONSE: ALL DETAILS NOT PROVIDED IN THE REPORT WERE CONSIDERED STANDARD PROCEDURES AND MAY BE OBTAINED FROM THE SOFTWARE MANUAL.

K.37 COMMENT: THE SOFTWARE USED IN DEVELOPING THE KRIGED CONTOUR MAPS IS MOST LIKELY AN EARLY VERSION THAT CONTAINS A NUMBER OF BUGS THAT COULD HAVE AFFECTED THE OUTCOME OF THIS ANALYSIS. (PRP-3)

EPA'S RESPONSE: THE MOST RECENT VERSION OF THE GEO-EAS SOFTWARE PACKAGE WAS OBTAINED FOR USE IN ANALYZING THE SOILS DATA. A LISTING OF ALL KNOWN BUGS (BOTH CORRECTED AND UNCORRECTED) WAS ALSO OBTAINED TO EVALUATE ANY POTENTIAL EFFECTS OF UNCORRECTED BUGS. FURTHER, THE DEVELOPER OF THE SOFTWARE WAS CONTACTED CONCERNING ALL KNOWN COMPUTATIONAL PROBLEMS AND THE EFFECT THESE PROBLEMS MIGHT HAVE ON THE ANALYSIS. BASED ON THIS EVALUATION, IT IS BELIEVED THAT THE RESULTS OF THE ANALYSIS ARE UNAFFECTED BY ANY KNOWN COMPUTATIONAL PROBLEMS WITH THE SOFTWARE.

K.38 COMMENT: THE RESULTS PRESENTED IN THE RI ADDENDUM WERE DEVELOPED USING UNVALIDATED DATA, AND THE EFFECTS OF INCLUDING DATA OF QUESTIONABLE RELIABILITY ARE NOT ADDRESSED WITH AN ADEQUATE LEVEL OF DETAIL. THE LIKELY RESULT OF ACCEPTING THESE DATA IS AN OVERESTIMATION OF THE ACCURACY OF THE KRIGED CONTOUR MAPS, WHICH IS THE BASIS FOR MOST OF THE INTERPRETATIONS IN THIS REPORT. (PRP-3)

EPA'S RESPONSE: ALL DATA COLLECTED DURING THIS INVESTIGATION HAVE BEEN VALIDATED ACCORDING TO ESTABLISHED EPA PROCEDURES BY A FIRM OF ANALYTICAL CHEMISTS; DETAILS ARE PROVIDED IN A SEPARATE REPORT. VALIDATION WAS

PERFORMED AFTER GEOSTATISTICAL ANALYSES. AS STATED IN THE RI ADDENDUM, ALL CALCULATIONS USED RAW (PRIOR TO VALIDATION) ANALYTICAL DATA. THE RESULTS OF THE DATA VALIDATION INDICATED THAT ONLY A RELATIVELY SMALL NUMBER OF RAW DATA VALUES HAD BEEN INCORRECTLY REPORTED BY THE LABORATORY AND THAT THE ANALYTICAL DATA ARE THE HIGHEST POSSIBLE ANALYTICAL QUALITY. THE POSSIBLE EFFECT OF THESE INCORRECTLY REPORTED DATA VALUES ON THE RESULTS REPORTED IN THE RI ADDENDUM WAS EVALUATED, AND IT WAS DETERMINED THAT RE-CALCULATION WOULD NOT BE NECESSARY NOR JUSTIFIED FROM A TIME/COST STANDPOINT. THE INCREASE IN UNCERTAINTY RESULTING FROM USING THE RAW DATA WOULD NOT BE DETECTABLE, AND WOULD THEREFORE HAVE LITTLE IMPACT ON THE FINAL RESULTS.

K.39 COMMENT: THE RI ADDENDUM STATES THAT APPROXIMATELY 20 PERCENT OF THE LEAD AND ARSENIC ANALYSES WERE QUALIFIED BY THE LABORATORY BECAUSE CLP CRITERIA WERE NOT MET. THE RI ADDENDUM DOES NOT PRESENT ANY JUSTIFICATION FOR ACCEPTANCE OF THE QUALIFIED DATA. IT IS NOT KNOWN WHETHER THIS ACCEPTANCE WAS CONSISTENT WITH ANY ESTABLISHED DATA QUALITY REQUIREMENTS, OR WAS MERELY A MATTER OF CONVENIENCE. (PRP-3)

EPA'S RESPONSE: ACCEPTANCE OF THE QUALIFIED DATA WERE BASED ON STANDARD EPA PROTOCOL. IF THE DATA WERE QUESTIONABLE TO THE DEGREE THAT RESULTS BASED ON THE DATA COULD HAVE AN IMPACT ON THE RI ADDENDUM, THESE DATA WOULD HAVE BEEN QUALIFIED AS REJECTED AND NOT USABLE. NO DATA WERE QUALIFIED AS REJECTED OR NOT USABLE.

K.40 COMMENT: THE POSSIBLE IMPACT OF INCLUDING THE QUALIFIED DATA, AS EXPRESSED IN THE RI ADDENDUM, IS MISLEADING AND FAILS TO ADDRESS THE QUESTION WITH AN APPROPRIATE LEVEL OF DETAIL. (PRP-3)

EPA'S RESPONSE: THE RI ADDENDUM SUMMARIZES THE DATA VALIDATION RESULTS. THE COMPLETE DATA VALIDATION REPORT MAY BE OBTAINED FROM THE EPA.

K.41 COMMENT: ELIMINATION OF THE QUALIFIED DATA WOULD HAVE RESULTED IN A SPARSER NETWORK OF DATA POINTS FROM WHICH TO DEVELOP THE KRIGED CONTOUR MAPS. THIS SPARSER NETWORK WOULD HAVE RESULTED IN HIGHER KRIGING STANDARD DEVIATIONS, WHICH WOULD HAVE BEEN REFLECTED IN THE KRIGED ERROR MAPS. THEREFORE, EXCLUSION OF SOME OR ALL OF THE QUALIFIED DATA WOULD ALMOST CERTAINLY HAVE INCREASED THE LEVEL OF UNCERTAINTY ASSOCIATED WITH THE KRIGED CONTOUR MAPS THAT ARE THE BASIS FOR THE RESULTS AND INTERPRETATIONS PRESENTED IN THIS REPORT. THUS, THE TRUE LEVEL OF UNCERTAINTY OF THE KRIGED CONTOUR MAPS HAS BEEN UNDERESTIMATED IN THE RI ADDENDUM. (PRP-3)

EPA'S RESPONSE: ALL DATA WERE QUALIFIED AS ACCEPTABLE AND USABLE ACCORDING TO STANDARD EPA PROTOCOL. THEREFORE, IT WAS NOT NECESSARY TO REMOVE DATA POINTS. NOR TO TEST ANY POSSIBLE EFFECTS ON OVERALL UNCERTAINTY.

STATISTICS

K.42 COMMENT: THE RI ADDENDUM INAPPROPRIATELY APPLIES STATISTICAL METHODS. (PRP-1)

EPA'S RESPONSE: THE RI ADDENDUM IS BELIEVED TO HAVE PROPERLY APPLIED ALL STATISTICAL METHODS TO BEST EVALUATE THE LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS FOR MIDVALE RESIDENTIAL SOILS.

K.43 COMMENT: THROUGHOUT THE RI ADDENDUM, STATISTICS ARE USED IN AN ATTEMPT TO SUPPORT A CONCLUSION. (PRP-1)

EPA'S RESPONSE: STATISTICS ARE USED TO EVALUATE AND GROUP DATA, IDENTIFY TRENDS, AND ILLUSTRATE ANY RELATIONAL NATURE OF THE DATA. CONCLUSIONS ARE SUGGESTED BASED ON THE STATISTICAL RESULTS AND ON OTHER OBSERVATIONS MADE FROM THE DATA.

K.44 COMMENT: THE USE OF STATISTICS IS IN MANY CASES IMPROPER IN THAT MULTIPLE PARAMETERS ARE ALLOWED TO VARY, UNDERMINING THE ABILITY TO PROPERLY USE STATISTICS. ONE PARTICULAR CASE IN POINT INVOLVES THE DETERMINATION THAT THERE IS NO DIFFERENCE IN THE CLP DETERMINATION OF LEAD OR CADMIUM VALUES IN SOILS BASED UPON SAMPLE SIZE. (PRP-1)

EPA'S RESPONSE: STATISTICAL METHODS ARE BELIEVED TO HAVE BEEN USED PROPERLY. ALL STATISTICAL FORMULATIONS WERE CONDITIONED SUCH THAT PARAMETERS (OR GROUPS OF PARAMETERS) WERE SYSTEMATICALLY VARIED AND/OR CONTROLLED TO PROVIDE THE MOST OBJECTIVE RESULTS POSSIBLE. THE ACTUAL STATISTICAL TEST DETERMINED THAT GRINDING OF A SAMPLE HAD NO STATISTICALLY DISCERNIBLE EFFECT ON THE ANALYTICAL DETERMINATION OF LEAD AND CADMIUM CONCENTRATION IN A SAMPLE.

K.45 COMMENT: THE RI ADDENDUM FAILS TO ACCOUNT FOR THE INHERENT VARIATION OR PRECISION OF THE REPEATED ANALYSES OF AN INDIVIDUAL SAMPLE AND KEEPS IN ITS DATA SET RESULTS INDICATING THAT A GROUND FRACTION OF A SAMPLE CAN ANALYTICALLY PRODUCE A LOWER RESULT THAN AN UNGROUND FRACTION OF THE SAME SAMPLE. THIS IS NOT SCIENTIFICALLY FEASIBLE AND REPRESENTS AN ATTEMPT TO APPLY STATISTICAL METHODS WITHOUT THE PROPER CONTROL OF ALL VARIABLES. (PRP-1)

EPA'S RESPONSE: BOTH DATA SETS (GROUND AND UNGROUND) WERE ANALYZED BY THE SAME METHOD, AND THEREFORE CONTAINED THE SAME ANALYTICAL PRECISION. ANALYTICAL PRECISION WAS THEREFORE CONSTANT ACROSS THE TWO DATA

SETS, AND THIS VARIABLE WAS THEREFORE CONTROLLED. THE STATISTICAL TEST WAS DESIGNED TO DETERMINE WHETHER GRINDING OF A SAMPLE RESULTED IN A STATISTICALLY DISCERNIBLE INCREASE IN LEAD, CADMIUM OR ARSENIC CONCENTRATION. NO DISCERNIBLE INCREASE WAS INDICATED FOR LEAD OR CADMIUM; HOWEVER, A DISCERNIBLE INCREASE WAS INDICATED FOR ARSENIC AT THE 95 PERCENT CONFIDENCE LEVEL. THE REPORT SPECULATES THAT THIS INCREASE MAY BE DUE TO MORE COMPLETE DIGESTION OF THE ARSENIC-CONTAINING PARTICLES (FOLLOWING THEIR BREAKDOWN BY GRINDING). THIS EXPLANATION IS BOTH SCIENTIFICALLY FEASIBLE AND NOT TOTALLY UNEXPECTED BASED ON COMMON LABORATORY PRACTICES.

K.46 COMMENT: THE REGRESSION MODELS RELATING THE CONCENTRATION OF THE CONTAMINANTS OF CONCERN ARE BIASED, AND THE ACCURACY OF THESE MODELS HAS NOT BEEN REPORTED. (PRP-3)

EPA'S RESPONSE: THE REGRESSION RESULTS ARE NOT BELIEVED TO BE BIASED. THE ACCURACY OF THE MODELS CAN ONLY BE DETERMINED FOLLOWING REMEDIAL DESIGN AND/OR REMEDIAL ACTION.

K.47 COMMENT: THE DEGREE OF ASSOCIATION BETWEEN THE CONCENTRATIONS OF INTEREST IS CHARACTERIZED IN THE REPORT BY THE CORRECTION COEFFICIENT OF THE LOGARITHMS OF THE CONCENTRATIONS; HOWEVER, THESE CORRECTION COEFFICIENTS ARE ONLY VALID IN THE LOG-LOG SPACE. (PRP-3)

EPA'S RESPONSE: SINCE THE EXPERIMENTAL DATA SETS WERE LOG-NORMALLY DISTRIBUTED, THEY WERE NATURAL-LOG TRANSFORMED.

K.48 COMMENT: MODELS FOR RELATING THE CONCENTRATIONS OF TWO ELEMENTS THAT HAVE BEEN CALIBRATED BY REGRESSION OF THE LOGS ARE BIASED UNLESS THE MODELS FIT PERFECTLY; THESE DO NOT. (PRP-3)

EPA'S RESPONSE: NO MODEL FITS PERFECTLY. IT IS BELIEVED THAT REGRESSION OF THE LOGS PROVIDES THE MOST PROPER AND UNBIASED METHOD IN DESCRIBING THE ASSOCIATIONS BETWEEN ELEMENTS THAT ARE LOG-NORMALLY DISTRIBUTED.

K.49 COMMENT: THE ACCURACY WITH WHICH THESE MODELS CAN BE USED TO ESTIMATE THE CONCENTRATION OF ONE CONTAMINANT FROM THE CONCENTRATION OF ANOTHER HAS NOT BEEN CORRECTLY DETERMINED OR REPORTED. (PRP-3)

EPA'S RESPONSE: ACCURACY CANNOT BE DETERMINED. PRECISION (UNCERTAINTY) IN TERMS OF STANDARD DEVIATION IS REPORTED IN THE RI ADDENDUM.

SAMPLE PREPARATION

K.50 COMMENT: THE CONCENTRATION OF CONTAMINANTS WAS MEASURED BY THE CLP LABORATORY ON SAMPLES THAT HAD BEEN SIEVED TO REMOVE ALL PARTICLES GREATER THAN 2 MM (MILLIMETERS) IN THE LARGEST DIMENSION. THOUGH THE WEIGHTS OF THE LARGER PARTICLES REMOVED FROM EACH SAMPLE WERE RECORDED, THEY ARE NOT REPORTED IN THE RI ADDENDUM, AND THE CONCENTRATION DATA DO NOT APPEAR TO HAVE BEEN ADJUSTED TO ACCOUNT FOR THIS SIEVING. (PRP-3)

EPA'S RESPONSE: INTERPRETATION AND ANALYSES OF THE GREATER THAN 2-MM FRACTION WERE NOT PART OF THE INVESTIGATION. THE WEIGHTS OF THE GREATER THAN 2-MM FRACTION WERE RECORDED AT THE REQUEST OF THE PRPS. HOWEVER, THEY ARE NOT REPORTED IN THE RI ADDENDUM. NO CALCULATIONS OR CORRECTIONS WERE MADE USING THESE DATA.

K.51 COMMENT: ASSUMING THAT THE CONTAMINANTS ARE ASSOCIATED WITH THE SMALLER GRAIN SIZES, WHICH SEEMS LIKELY IF SUB-AERIAL DEPOSITION WAS THE PRIMARY MECHANISM OF CONTAMINATION, REMOVAL OF THE LARGER PARTICLES BEFORE ANALYSES WOULD RESULT IN HIGHER CONCENTRATION VALUES. THE RELATIONSHIP BETWEEN CONTAMINANT CONCENTRATION AND GRAIN SIZE WAS INVESTIGATED FOR PARTICLES OF LESS THAN 2 MM, BUT CONTAMINANT LEVELS IN THE LARGER FRACTIONS WERE NOT DETERMINED. (PRP-3)

EPA'S RESPONSE: THE PROTOCOL ESTABLISHED FOR THIS INVESTIGATION DEFINED THE SOIL AS THAT FRACTION CONTAINING PARTICLES LESS THAN 2 MM IN SIZE. THIS IS CONSISTENT WITH MOST INVESTIGATIONS OF THIS TYPE. THIS TECHNIQUE IS USED BECAUSE PARTICLES GREATER THAN 2 MM IN SIZE ARE UNLIKELY TO BECOME AIRBORNE OR CLING TO PEOPLE'S CLOTHES OR SKIN. THEREFORE, DIRECT PHYSICAL CONTACT IS NOT AS GREAT A CONCERN FOR THESE PARTICLES. EPA'S INTEREST IS CORRECTLY PLACED ON THE PARTICLE SIZE RANGE WITH THE HIGHEST POTENTIAL IMPACT.

K.52 COMMENT: FROM THE DESCRIPTION IN THE RI ADDENDUM, IT APPEARS THAT SOME OF THE MATERIAL REMOVED FROM THE SOIL SAMPLES BEFORE ANALYSES MAY HAVE CONSISTED OF AGGREGATES MADE UP OF PARTICLES LESS THAN 2 MM IN SIZE. THIS SUGGESTS AN ADDITIONAL SOURCE OF BIAS IN THE DATA SET IF THESE AGGREGATED PARTICLES DIFFERED IN COMPOSITION OR CONTAMINANT LEVELS FROM THE DISAGGREGATED MATERIAL. IN THE ABSENCE OF THESE DIFFERENCES, ANY SAMPLE-TO-SAMPLE VARIATION IN THE WEIGHT OF THE AGGREGATES REMOVED BEFORE ANALYSES WOULD LEAD TO ADDITIONAL IMPRECISION. (PRP-3)

EPA'S RESPONSE: THE NATURE OF SOILS MAKES IT DIFFICULT TO DISAGGREGATE ALL PARTICLES BY MECHANICAL METHODS. EVERY EFFORT WAS MADE TO REDUCE LARGE AGGREGATES; HOWEVER, THIS CANNOT REASONABLY BE EXPECTED TO BE 100 PERCENT EFFECTIVE. OVERALL, IT IS BELIEVED THAT THE SAMPLE PREPARATION METHODS EMPLOYED FOR THIS

INVESTIGATION WERE EFFECTIVE IN OBTAINING A REPRESENTATIVE SAMPLE OF THE LESS THAN 2-MM PORTION OF EACH SOIL SAMPLE.

K.53 COMMENT: THE BASELINE RISK ASSESSMENT'S PREDICTIONS OF PARTICULATE CONCENTRATIONS IN AIR ARE ARBITRARY AND CANNOT BE JUSTIFIED. ALTHOUGH THE DIRECT INHALATION PATHWAY IS A MINOR CONTRIBUTOR TO TOTAL RISKS PREDICTED IN THE BASELINE RISK ASSESSMENT, THE EXPERT COMMENTS ON THE ADMINISTRATIVE RECORD REGARDING THE INACCURACIES IN THE AIR MODELING APPLY TO THE RISK ASSESSMENT. IN ADDITION, TO ACCOUNT FOR THE INDUSTRIAL SOURCE COMPLEX (ISC) OVERPREDICTION OF PARTICULATE CONCENTRATION, A FACTOR OF 1.62 WAS ARBITRARILY APPLIED IN THE BASELINE RISK ASSESSMENT TO REDUCE THE PREDICTED AIR CONCENTRATION. THIS OVERPREDICTION CANNOT BE CORRECTED BY A SINGLE FACTOR AS APPLIED IN THE BASELINE RISK ASSESSMENT.

IT IS COMPLETELY UNCLEAR FROM THE BASELINE RISK ASSESSMENT WHAT LOCATIONS ARE ASSOCIATED WITH THE THREE "LEAD CONCENTRATION BANDS" AND HOW A MODELED AMBIENT CONCENTRATION WAS MATCHED TO A SOIL-LEAD CONCENTRATION. IT IS DIFFICULT TO MATCH AN AMBIENT CONCENTRATION PREDICTED BY THE MODEL WHICH DECREASES WITH DISTANCE FROM THE FENCELINE TO AN AREA OR "BAND" OF SOIL-LEADS. THE PROCESS OF SUCH ASSIGNMENT WAS APPARENTLY ARBITRARY AND UNDISCLOSED TO THE PUBLIC. (PRP 4)

EPA'S RESPONSE: THE PARTICULATE AIR CONCENTRATIONS ARE NEITHER ARBITRARY NOR UNJUSTIFIABLE. THESE CONCENTRATIONS ARE BASED ON EMISSIONS AND TRANSPORT MODELING THAT USED EPA APPROVED METHODOLOGIES. BOTH THE UNIVERSAL SOILS LOSS EQUATION USED FOR ESTIMATING THE PARTICULATE EMISSION RATE, AND THE INDUSTRIAL SOURCE COMPLEX MODEL USED FOR AIR DISPERSION AND PARTICLE DEPOSITION HAVE APPEARED IN EPA GUIDANCE DOCUMENTS FOR USE IN EXPOSURE ASSESSMENTS. IT IS TRUE THAT MANY OF THE INPUT PARAMETERS USED IN THE EMISSIONS AND DISPERSION MODELING REPRESENT VERY CONSERVATIVE ASSUMPTIONS; HOWEVER, THESE VALUES ARE NOT INCORRECT BUT RATHER THEY REPRESENT THE UPPER BOUND OF THE POSSIBLE RANGE, AND THEIR USE IN THIS ASSESSMENT IS HEALTH PROTECTIVE. THE CORRECTION FACTOR OF 1.62 THAT WAS APPLIED TO THE INDUSTRIAL SOURCE COMPLEX PARTICLE CONCENTRATION AND DEPOSITION ESTIMATES WAS NOT AN ARBITRARY FACTOR. THIS FACTOR WAS SELECTED AFTER EXTENSIVE REVIEW OF AVAILABLE LITERATURE, AND WAS CONSIDERED RELEVANT BECAUSE IT WAS DETERMINED FROM COMPARISONS OF FIELD MEASUREMENTS WITH INDUSTRIAL SOURCE COMPLEX PREDICTIONS. THE USE OF THIS FACTOR IS INDEED A SIMPLIFICATION THAT WOULD BE COMPOUNDED IF THIS FACTOR WERE APPLIED TO ALL MODELED RECEPTORS. HOWEVER, THIS FACTOR WAS ONLY APPLIED TO THE NARROW BAND OF MODEL RECEPTORS IN THE RESIDENTIAL AREA ADJACENT TO THE TAILINGS PILE.

K.54 COMMENT: RESEARCH PUBLISHED BY CHANEY (CHANEY ET AL., 1984 AND CHANEY 1988) INDICATES THAT VEGETABLES TAKE UP LEAD FROM SOIL MORE READILY IF THE LEAD IS IN SOLUBLE FORM. HOWEVER, THE LEAD FOUND IN TAILINGS IS GENERALLY IN THE FORM OF LOW SOLUBILITY OXIDES, SULFIDES, AND SULFATES. SOLUBLE SALT STUDIES WERE INCLUDED IN THE DEVELOPMENT OF THE BAES UPTAKE FACTORS FOR LEAD. THE FACTOR Y IN THE BAES EQUATION IS APPARENTLY A TYPOGRAPHICAL ERROR, AS YIELD IS NOT USED IN THE BAES EQUATION AND WAS APPARENTLY NOT USED IN THE BASELINE RISK ASSESSMENT CALCULATIONS. A GENERAL CRITICISM OF THE BAES WORK IS THE VARIETY OF DIFFERENT EXPERIMENTAL CONDITIONS (NONE OF WHICH MAY BE SIMILAR TO THOSE AT MIDVALE) WHICH WERE USED TO DEVELOP THE UPTAKE FACTORS. THE BASELINE RISK ASSESSMENT'S ESTIMATED VEGETABLE CONCENTRATIONS ARE HIGHLY SUSPECT, BECAUSE SITE-SPECIFIC CHARACTERISTICS OF THE TAILINGS AND SOILS AT MIDVALE WERE NOT INCLUDED IN EPA'S CALCULATIONS. (PRP 4)

EPA'S RESPONSE: THE PRPS ARE CORRECT IN ASSUMING THAT THE Y (YIELD) TERM IS A TYPOGRAPHICAL ERROR WHICH WAS NOT CAUGHT IN REVIEW.

NONETHELESS, EPA HAS REASON TO BELIEVE THAT THE ESTIMATES ARE NOT "HIGHLY SUSPECT." EPIDEMIOLOGIC STUDIES ARE SUBJECT TO THE LIMITATIONS OF OTHER INVESTIGATIONS, AS WELL AS TO ADDITIONAL UNCERTAINTIES ASSOCIATED WITH UNCONTROLLED HUMAN SUBJECTS. THE ABOVE CALCULATION USING "TYPICAL BACKGROUND" LEVELS OF LEAD IN SOILS ESTIMATES A LEVEL OF LEAD IN FOOD DEEMED TYPICAL OF THE AMERICAN DIET IN THE CURRENT ERA, WHERE LEAD FROM SOLDER IN CANS HAS BEEN GREATLY REDUCED. THUS, THE BAES WORK GIVES AN ESTIMATE CONSISTENT WITH CURRENT DIETARY LEVELS. FURTHER, THE GARDEN STUDY IN MIDVALE GAVE RESULTS CONSISTENT WITH THE PREDICTIONS OF THE MODEL. ALTHOUGH THIS STUDY IS NOT WITHOUT LIMITATIONS, IT IS SUFFICIENT TO INDICATE THAT THE ESTIMATES ARE IN THE CORRECT RANGE.

FURTHERMORE, THE SCIENTIFIC DATABASE, (EPA 1985, ENVIRONMENTAL PROFILE FOR CONSTITUENTS OF MUNICIPAL SLUDGE, ELWOOD, P.C. 1986) GENERALLY INDICATES THAT THERE IS SUBSTANTIAL VARIABILITY IN METAL UPTAKE INTO PLANTS AND THAT SUCH ESTIMATES ARE AMONG THE MOST DIFFICULT IN ALL OF LEAD RESEARCH. THESE METHODOLOGICAL PROBLEMS DICTATE THAT CONSERVATIVE ASSUMPTIONS SHOULD BE APPLIED.

K.55 COMMENT: DR. BORNSCHEIN'S BLOOD-LEAD STUDY RESULTS MUST SUPPLANT, OR, AT THE VERY LEAST, BE INCORPORATED INTO EPA'S APPLICATION OF THE IU/BK MODEL. THE IU/BK MODEL TRIES TO PREDICT ACTUAL BLOOD-LEAD VALUES IN THE OFF-SITE RESIDENTIAL COMMUNITY; SINCE THOSE ACTUAL VALUES ARE NOW KNOWN, THE UTILITY OF MODELING IS MINIMAL. REAL-LIFE DATA MUST BE USED OVER MODELING APPROXIMATIONS WHEN ASSESSING RISK. DR. BORNSCHEIN'S STUDY OF ABOUT 60 PERCENT OF ALL FAMILIES WITH ELIGIBLE CHILDREN IN MIDVALE FOUND THAT BLOOD-LEAD LEVELS IN THOSE CHILDREN ARE AT OR BELOW THE NATIONAL AVERAGE AND LEVELS FOUND AT PARK CITY AND OTHER MILLING SITES IN THE AREA. IN MIDVALE, THEY ARE AMONG THE LOWEST EVER SEEN IN A BLOOD-LEAD STUDY OF THIS NATURE. (PRP 4)

EPA'S RESPONSE: EPA IS EVALUATING THE MIDVALE BLOOD-LEAD STUDY. THIS EVALUATION WILL BE COMPLETED BEFORE IMPLEMENTATION OF THE REMEDY. EPA STRONGLY DISAGREES WITH THE STATEMENT THAT "REAL-LIFE DATA MUST BE USED OVER MODELING APPROXIMATIONS WHEN ASSESSING RISK." EPIDEMIOLOGIC STUDIES ARE SUBJECT NOT ONLY TO ALL THE LIMITATIONS OF OTHER INVESTIGATIONS, BUT ALSO TO ADDITIONAL UNCERTAINTIES ASSOCIATED WITH UNCONTROLLED HUMAN SUBJECTS. THUS, RESULTS MUST BE CAREFULLY EVALUATED, STUDY LIMITATIONS CLEARLY DEFINED, AND CONCLUSIONS EXHAUSTIVELY COMPARED TO KNOWLEDGE OF PHYSIOLOGY. CHEMISTRY, ETC. IT IS CERTAINLY POSSIBLE FOR A "REAL LIFE" STUDY TO PRESENT A LESS ACCURATE PICTURE OF RISK THAN ONE BASED ON EXPERIMENTAL DATA FROM OTHER SOURCES. AS AN EXAMPLE, IT IS OFTEN DIFFICULT TO EXTRAPOLATE FROM A SINGLE-TIME STUDY THE POTENTIAL FOR FUTURE EXPOSURE, AND, HENCE, RISK.

K.56 COMMENT: FOR PURPOSES OF EVALUATING CANCER RISKS IN US POPULATIONS, IT IS IMPORTANT TO CONSIDER RESULTS FROM THREE EPIDEMIOLOGICAL STUDIES CARRIED OUT IN THE US. NONE OF THESE FOUND A POSITIVE RELATIONSHIP BETWEEN ARSENIC LEVELS IN DRINKING WATER AND ADVERSE EFFECTS. THE US STUDIES STRONGLY SUGGEST THAT THE RISK MAY BE MUCH LOWER THAN IS SUGGESTED BY EPA'S CANCER POTENCY FACTOR (CPF).

THE EPA HAS DEVELOPED A CANCER POTENCY FACTOR FOR INGESTED ARSENIC OF 1.75 DERIVED FROM THE TAIWANESE EPIDEMIOLOGY DATA. ARSENIC LEVELS OF DRINKING WATER IN TAIWAN GREATLY EXCEED THOSE OF THE US COMMUNITIES STUDIED. THE DURATION OF EXPOSURE WAS PROBABLY SHORTER AND THE AMOUNT OF ARSENIC INGESTED WAS MUCH LESS IN THE US STUDIES THAN IN THE TAIWANESE STUDIES. IN ADDITION, LACK OF ADEQUATE NUTRITION AND EXPOSURE TO OTHER ENVIRONMENTAL POLLUTANTS MAY HAVE EXACERBATED THE EFFECTS OF ARSENIC EXPOSURE IN TAIWAN. THE DIFFERENCES IN EXPOSURE TO SUNLIGHT BETWEEN TAIWAN AND ALASKA MAY HAVE BEEN A FACTOR IN THE OBSERVED ABSENCE OF SKIN DISORDERS IN THE FAIRBANKS STUDY AND THE UTAH STUDY. IN ADDITION, THE TAIWAN STUDIES DID NOT INCLUDE ANALYSES OF DRINKING WATER CONSTITUENTS OTHER THAN ARSENIC IN THE WATER SOURCES OF THE EXPOSED AND CONTROLLED GROUPS. THIS LACK OF ASSESSMENT REDUCES THE EXTENT TO WHICH CONFIDENCE CAN BE PLACED IN THE POSTULATED ASSOCIATION BETWEEN ARSENIC LEVELS AND OBSERVED SKIN CANCER. THERE IS ALSO A POSSIBILITY THAT THE OBSERVERS MIGHT HAVE BEEN BIASED BY KNOWLEDGE OF THE HIGH- OR LOW-EXPOSURE AREAS. (PRP 1, 4)

EPA'S RESPONSE: THE ABOVE COMMENTS HAVE BEEN ADDRESSED IN GENERAL FASHION IN PREVIOUS RESPONSES. TO REITERATE THE EPA POSITION, CURRENT DATA ARE NOT DEEMED SUFFICIENT TO WARRANT A CHANGE IN THE SLOPE FACTOR FOR INGESTED ARSENIC. RISK MANAGERS ARE AWARE THAT THEY HAVE THE OPTION TO ALTER DECISIONS ON ACTION LEVELS BY UP TO AN ORDER OF MAGNITUDE.

K.57 COMMENT: IT IS ESSENTIAL THAT DECISION-MAKERS SEE OTHER RISKS YIELDED BY APPLICATION OF THIS CANCER POTENCY FACTOR, WHICH ARE:

- 1) THE AVERAGE AMERICAN'S EXPOSURE TO ARSENIC THROUGH DRINKING WATER IS 2.5 UG/L (MICROGRAMS PER LITER). USING THE EPA CANCER POTENCY FACTOR, THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH DRINKING WATER IS 1 IN 8000;
- 2) EPA ALLOWS ARSENIC IN DRINKING WATER TO REACH 50 UG/L. THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH THIS ALLOWABLE LEVEL USING EPA'S CANCER POTENCY FACTOR IS 1 IN 400; AND
- 3) ARSENIC EXPOSURE THROUGH FOOD AVERAGES 60 UG/DAY (MICROGRAMS PER DAY), AND YET THE US FOOD AND DRUG ADMINISTRATION (FDA) DOES NOT CONSIDER ARSENIC INGESTED THROUGH FOODS TO REPRESENT A SIGNIFICANT HUMAN CANCER RISK. THE EXCESS RISK ASSOCIATED WITH AVERAGE FOOD INTAKE OF INORGANIC ARSENIC USING EPA'S CANCER POTENCY FACTOR IS 1 IN 2000. THESE RISKS ARE HIGHER THAN EITHER EPA OR FDA HAS TYPICALLY FOUND ACCEPTABLE, YET THEY FOLLOW DIRECTLY FROM APPLICATION OF THE EPA'S CANCER POTENCY FACTOR.

THROUGH THESE EXAMPLES, THE VALIDITY OF THE CANCER POTENCY FACTOR IS SEEN TO BE HIGHLY QUESTIONABLE. (PRP 4)

EPA'S RESPONSE: EPA RISK MANAGERS ARE AWARE OF THE ABOVE. THEY ARE ALSO AWARE THAT MOST DIETARY ARSENIC IS IN ORGANIC FORMS WHICH ARE RELATIVELY QUICKLY ELIMINATED FROM THE BODY AND APPEAR TO HAVE SIGNIFICANTLY LESS POTENTIAL FOR ACUTE TOXIC EFFECTS.

K.58 COMMENT: EPA'S SCIENCE ADVISORY BOARD (SAB) SUGGEST THAT AT DOSE LEVELS BELOW 200 TO 250 UG/DAY, THERE IS A POSSIBLE DETOXIFICATION MECHANISM THAT MAY SUBSTANTIALLY REDUCE CANCER RISK FROM THE LEVELS EPA HAS CALCULATED USING THE LINEAR-QUADRATIC DOSE-RESPONSE MODEL FIT TO THE TSENG DATA ET AL. (1968). THERE IS SUBSTANTIAL EVIDENCE THAT AT LOW DOSES, BIOLOGICAL METHYLATION OF ARSENIC OCCURS, CONTRIBUTING IMPORTANTLY TO ITS REMOVAL FROM PATHWAYS LEADING TO CARCINOGENESIS AND THUS PROVIDING A LOW-DOSE DETOXIFICATION MECHANISM. EPA HAS NOT ATTEMPTED TO INCORPORATE THIS BIOLOGICAL METHYLATION, DESPITE A SCIENCE ADVISORY BOARD REPORT REVIEWED BY THE EPA ADMINISTRATOR, WHO AGREED THAT "THERE IS A NEED FOR A REVISED RISK ASSESSMENT BASED ON THE DELIVERED DOSE OF NON-DETOXIFIED ARSENIC AND FOR ADDITIONAL ANALYSES WHICH CONSIDER THE REDUCTION OF CANCER RISK DUE TO DETOXIFICATION" (REILLY 1989) INFORMATION INTO THE ARSENIC DOSE-RESPONSE MODEL. IT SHOULD BE DISCUSSED AND INCLUDED IN THE BASELINE RISK ASSESSMENT. (PRP 4)

THE TYPE OF CANCER ASSOCIATED WITH ARSENIC INGESTION IS TYPICALLY NONLETHAL (NON-MELANOMA SKIN CANCER; 1 PERCENT FATALITY RATE) AND HAS A HIGH TREATMENT SUCCESS RATE. THIS OBSERVATION SUPPORTS THE ARGUMENT THAT

THE ADVERSE EFFECTS OF ARSENIC INGESTION SHOULD BE VIEWED AS LESS SEVERE THAN RISK ESTIMATES OF EQUAL MAGNITUDE FOR CHEMICALS CAUSING OTHER MORE LETHAL FORMS OF CANCER. RISK ESTIMATES BASED ON THE INGESTED ARSENIC CANCER POTENCY FACTOR SHOULD BE DECREASED BY AS MUCH AS ONE OR TWO ORDERS OF MAGNITUDE TO ACCOUNT FOR THIS DIFFERENTIAL. (PRP 1, 4)

EPA'S RESPONSE: THE ABOVE COMMENTS HAVE BEEN ADDRESSED IN GENERAL FASHION IN PREVIOUS RESPONSES. TO REITERATE THE EPA POSITION, CURRENT DATA ARE NOT DEEMED SUFFICIENT TO WARRANT A CHANGE IN THE SLOPE FACTOR FOR INGESTED ARSENIC. RISK MANAGERS ARE AWARE THAT THEY HAVE THE OPTION TO ALTER DECISIONS ON ACTION LEVELS BY UP TO AN ORDER OF MAGNITUDE.

EPA RISK MANAGERS ARE AWARE OF THE ABOVE. THEY ARE ALSO AWARE THAT MOST DIETARY ARSENIC IS IN ORGANIC FORMS WHICH ARE RELATIVELY QUICKLY ELIMINATED FROM THE BODY AND APPEAR TO HAVE LESS POTENTIAL FOR ACUTE TOXIC EFFECTS.

L. HEALTH RISKS AND ACTION LEVELS

SOURCE OF CONTAMINATION AND BLOOD-LEAD LEVELS

L.1 COMMENT: WHILE ELEVATED HEAVY METAL CONCENTRATIONS EXIST IN SOME SAMPLES OF MIDVALE SOILS, AN INADEQUATE ATTEMPT HAS BEEN MADE TO DEFINE THE SOURCE AND MINERALOGICAL FORM OF LEAD, ARSENIC, AND CADMIUM FOR PURPOSES OF DETERMINING THE HEALTH RISK AND ACTION LEVELS. SLAG IS RESPONSIBLE FOR THE BULK OF THE LEAD AND ARSENIC. (PRP-T, 2)

EPA'S RESPONSE: AN OBJECTIVE OF THE RI ADDENDUM WAS TO COLLECT SUFFICIENT DATA WITH WHICH TO MAKE THIS DETERMINATION. THE REPORT IDENTIFIES THE STUDIES TO BE CONDUCTED, AND SUGGESTS, BASED ON THE GEOSTATISTICAL RESULTS PROVIDED, THAT THE PRIMARY SOURCE IS THE TAILINGS AND SMELTER SITES.

SEVERAL SCIENTIFIC INVESTIGATIONS SPECIFICALLY RELATED TO SOURCE ARE DESCRIBED IN THE RI ADDENDUM. THE RESULTS OF SOME OF THESE INVESTIGATIONS, WHICH ARE BASED ON DATA AND/OR SAMPLES COLLECTED DURING THE RESIDENTIAL SOILS INVESTIGATION, ARE PROVIDED IN OTHER REPORTS. ALL OF THESE INVESTIGATIONS, INCLUDING SPECIFIC RESULTS PROVIDED IN THE RI ADDENDUM, CONCLUDE THAT TWO PRIMARY SOURCES, THE TAILINGS AND SMELTER SITES, ARE RESPONSIBLE FOR THE HIGH LEAD, ARSENIC, AND CADMIUM CONCENTRATIONS MEASURED IN THE MIDVALE RESIDENTIAL SOILS. ONE OF THESE INVESTIGATIONS (REPORT OF DR. JOHN DREXLER) SPECIFICALLY DETERMINED THE MINERALOGIC FORMS OF LEAD AND ARSENIC IN MIDVALE SOILS USING SCANNING ELECTRON MICROSCOPE/TRANSMISSION MICROPROBE (SEM/TM) METHODS.

L.2 COMMENT: PRIOR TO THE RI ADDENDUM, EPA THEORIZED THAT THE ELEVATED HEAVY METAL LEVELS IN THE OFF-SITE SOILS WERE SOLELY A RESULT OF WIND-BLOWN DISPERSION OF TAILINGS PARTICLES FROM THE TAILINGS POND. PARTICLE SIZE STUDIES, EXTREMELY VARIABLE DATA, AND THE EXISTENCE OF HOT SPOTS DO NOT SUPPORT THIS THEORY. (PRP-1)

EPA'S RESPONSE: EPA EXPECTED THAT THE SOURCE OF CONTAMINATED SOILS MAY BE PRIMARILY DUE TO DISPERSION OF WIND-BLOWN TAILINGS. THE RESULTS PROVIDED IN THE RI ADDENDUM SUPPORT, BUT DO NOT CONFIRM BY THEMSELVES, THIS MECHANISM. PARTICLE SIZE STUDIES ARE ACKNOWLEDGED IN THE REPORT AS BEING INCONCLUSIVE; HOWEVER, THEY DO NOT REFUTE THE POSSIBILITY OF THE WIND DISPERSION MECHANISM. ALSO, WHILE THE DATA ARE VARIABLE, THE REGIONAL PATTERN OF CONTAMINANT CONCENTRATIONS (CONSISTENT WITH THE WIND DISPERSION MECHANISM) IS STILL DISTINGUISHABLE. FURTHERMORE, THE PRESENCE OF "HOT SPOTS" OR CELLS OF CONSIDERABLY HIGHER (OR LOWER) CONCENTRATIONS SUPERIMPOSED ON THE REGIONAL PATTERN MAY ALSO BE CONSISTENT WITH THE WIND DEPOSITION MECHANISM. THESE CELLS MAY BE THE EXPECTED RESULT OF PREFERRED LOCAL AREAS OF DEPOSITION, RESULTING FOR EXAMPLE FROM LOCAL OBSTRUCTIONS (BUILDINGS, ETC.) WHERE DEPOSITION MAY BE CONCENTRATED ON THE WINDWARD OR LEEWARD SIDE, OR LOCAL BARRIERS (CONCRETE PARKING LOTS, ETC.) WHERE DEPOSITION WOULD NOT HAVE OCCURRED.

L.3 COMMENT: ALTHOUGH WIND-BLOWN DISPERSION OF TAILINGS PARTICLES MAY OCCUR, THE MASS OF THE LEAD-CONTAINING PARTICLES AND THE HIGHLY VARIABLE DATA INDICATE THAT NUMEROUS, POSSIBLY RANDOM, SOURCES ARE CONTRIBUTING TO THE OBSERVED HEAVY METAL CONCENTRATIONS. (PRP-1)

EPA'S RESPONSE: THE DATA INDICATE THAT DISPERSION IS THE PRIMARY MECHANISM, EITHER WIND-BORNE OR MECHANICAL.

L.4 COMMENT: DURING THE PERIOD WHEN THE UNITED STATES SMELTING, REFINING & MINING COMPANY (USSRMC) OWNED THE MIDVALE SLAG SITE, USSRMC HAD AN AGREEMENT WITH THE UTAH STATE ROAD COMMISSION FOR SALE OF SLAG FOR ROAD BASE. SLAG WAS USED EXTENSIVELY IN MIDVALE FOR FILL, ROAD BASE, GRAVEL SURFACES, SNOW AND ICE CONTROL AND RAILROAD BALLAST. THE MIDVALE SLAG SITE WAS ACCESSIBLE TO PEOPLE OTHER THAN THE STATE WHO ALSO REMOVED SLAG FOR OTHER USES. (PRP-2)

EPA'S RESPONSE: THE RI ADDENDUM AND SUBSEQUENT EPA-BACKED STUDIES BASED ON SAMPLES AND DATA COLLECTED DURING THIS INVESTIGATION DO NOT DISPUTE THE PRESENCE OF SLAG AND OTHER SMELTER-DERIVED MATERIALS IN THE MIDVALE AREA. HOWEVER, THE RI ADDENDUM AND OTHER STUDIES SUPPORT TAILINGS AS A PRIMARY CONTAMINANT SOURCE.

L.5 COMMENT: DR. JOHN DREXLER, EPA'S EXPERT, PERFORMED AN ELECTRON MICROPROBE ANALYSIS ON OFF-SITE SOILS, SLAG, TAILINGS AND OTHER MATERIALS AND MADE NO ATTEMPT TO QUANTIFY THE RELATIVE CONTRIBUTION OF EACH SOURCE. (PRP-2)

EPA'S RESPONSE: THIS STUDY CONSISTED OF THE USE OF SCANNING ELECTRON MICROSCOPE COUPLED WITH TRANSMISSION MICROPROBE ANALYSIS (SEM/TM) OF A SUBSET OF THE SAMPLES (35) COLLECTED IN THE MIDVALE AREA AND FROM THE TAILINGS AND SMELTER SITES. THE SMALL SUBSET OF SAMPLES USED IN DR. DREXLER'S ANALYSIS MADE DETERMINATION OF THE RELATIVE CONTRIBUTION OF EACH SOURCE STATISTICALLY UNRELIABLE.

L.6 COMMENT: DR. HARVEY BLATT, CONDUCTED THREE CALCULATIONS TO DETERMINE SOURCES OF LEAD IN THE OFF-SITE SOILS. HE FOUND THAT THE UPPER TWO INCHES OF SAND IN THE MIDVALE RESIDENTIAL SOIL SAMPLES HE EXAMINED CONTAIN AN AVERAGE OF 36.2 PERCENT SLAG PARTICLES: I.E., MORE THAN ONE IN THREE SAND-SIZED GRAINS IN THE SOIL IS SLAG. ALMOST ALL THE OTHER SAND-SIZED GRAINS ARE QUARTZ, WHICH CONTAINS NO LEAD, ARSENIC, OR CADMIUM. DR. BLATT CALCULATED THAT GALENA COMPRISES ABOUT ONE-HUNDREDTH OF ONE PERCENT (0.0001) OF THE RESIDENTIAL SOILS HE EXAMINED. THIS AMOUNT OF GALENA COULD SUPPLY NO MORE THAN 100 PPM LEAD TO THESE RESIDENTIAL SOILS, A CONCENTRATION WELL BELOW EPA'S PROPOSED ACTION LEVEL. (PRP-2)

DR. BLATT CONCLUDED THAT THE CURRENT MIDVALE SOIL SAMPLES HE EXAMINED ARE FORMED OF 68.48 PERCENT ORIGINAL NATIVE SOIL, 26.5 PERCENT SLAG FRAGMENTS, AND 3.1 PERCENT OTHER MATERIALS, INSOFAR AS CONTRIBUTION OF LEAD TO THE OFF-SITE SOILS IS CONCERNED. THE 3.1 PERCENT OTHER MATERIALS INCLUDES BOTH GALENA FROM TAILINGS AND LEAD ADSORBED ON CLAY IN THE RESIDENTIAL SOILS. THIS CLAY MAY HAVE BEEN BLOWN FROM THE TAILINGS PILE, OR IT MAY BE BACKGROUND SOIL CLAY THAT HAS ADSORBED LEAD FROM NATURAL SOIL CONSTITUENTS. DR. BLATT CONCLUDED THAT THE LEAD IN THE OFF-SITE SOILS RESULTS FROM 90.1 PERCENT OF SLAG AND 9.9 PERCENT OF OTHER MATERIALS, ONE OF WHICH IS TAILINGS.

DR. BLATT'S DATA INDICATE THAT THE THREE-DIMENSIONAL DISTRIBUTION AND VARIATION OF HIGH LEAD VALUES IN THE RESIDENTIAL SOILS RESULT ALMOST ENTIRELY FROM THE THREE-DIMENSIONAL DISTRIBUTION OF SLAG IN THE RESIDENTIAL SOILS. (PRP-2)

EPA'S RESPONSE: EPA VIEWS DR. BLATT'S METHODS AND RESULTING CALCULATIONS AS CONTAINING A POSSIBLY HIGH LEVEL OF STATISTICAL UNCERTAINTY DUE TO (1) USE OF A SMALL AND POSSIBLY NON-REPRESENTATIVE SAMPLE SUBSET; (2) UNKNOWN AND UNQUANTIFIED UNCERTAINTY IN CHARACTERIZING THE SOURCE OF PARTICLES BASED ON PHYSICAL CHARACTERISTICS; (3) NON-REPRESENTATIVE USE OF VALUES FOR AVERAGE TAILINGS AND SLAG LEAD CONCENTRATIONS; AND (4) POSSIBLY BIASED CONCLUSIONS BASED ON UNQUANTIFIED AND UNCONTROLLED VARIABLES IN MATHEMATICAL EQUATIONS.

L.7 COMMENT: DR. BLATT AGREES WITH DR. DREXLER'S CONCLUSION THAT THE OFF-SITE SOILS CONTAIN BOTH SLAG AND TAILINGS AND THAT THE DOMINANT LEAD-BEARING MATERIAL IN THE SOILS, EXCLUDING SLAG, IS GALENA FROM THE TAILINGS. (PRP-2)

EPA'S RESPONSE: DR. DREXLER SHOWED THAT GALENA IS FOUND IN TAILINGS AND RESIDENTIAL SOILS, BUT NOT IN SLAG IN SIGNIFICANT QUANTITIES.

L.8 COMMENT: A STATISTICALLY SIGNIFICANT CORRELATION BETWEEN RESIDENTIAL SOIL-LEAD LEVELS AND RESIDENTIAL SOIL-ARSENIC LEVELS IS INDICATED BY THE ANALYSES PERFORMED IN THE RI ADDENDUM AND THE MIDVALE COMMUNITY LEAD STUDY. USING THIS PROJECTED RELATIONSHIP THE POTENTIAL MAJOR SOURCE OF LEAD IN RESIDENTIAL SOILS IS LIKELY ALSO VALID FOR ARSENIC. (PRP-2)

EPA'S RESPONSE: A MODERATE DEGREE OF ASSOCIATION BETWEEN LEAD AND ARSENIC IN MIDVALE SOILS IS INDICATED. HOWEVER, THE RI ADDENDUM MAKES NO ATTEMPT TO DETERMINE A CAUSE/EFFECT (SOURCE) RELATIONSHIP BASED ON THE REGRESSION RESULTS (TO DO SO WOULD BE AN INCORRECT APPLICATION OF THE STATISTICAL METHOD). INSTEAD, THE RI ADDENDUM USES THE ASSOCIATION TO INDICATE TO WHAT DEGREE THE CLEANUP OF LEAD MAY ALSO RESULT IN THE CLEANUP OF ARSENIC-CONTAMINATED SOILS.

THE GEOSTATISTICAL (KRIGING) RESULTS INDICATE SIMILAR PATTERNS OF DISTRIBUTION OF LEAD AND ARSENIC IN MIDVALE SOILS. THE RI ADDENDUM SUGGESTS THAT THESE SIMILAR PATTERNS MAY BE DUE TO SIMILAR MECHANISMS OF TRANSPORT AND/OR DEPOSITION. HOWEVER, THE PATTERN FOR ARSENIC BECOMES LESS SIMILAR TO THAT OF LEAD FOR THE DEEPER DEPTH INTERVALS. THE PATTERN FOR ARSENIC IN THE DEEPER DEPTH INTERVALS SUGGESTS THAT THE SMELTER SITE MAY HAVE BEEN AN EARLIER ARSENIC SOURCE.

L.9 COMMENT: AT WORST, ELEVATED LEAD AND ARSENIC VALUES ARE FOUND RANDOMLY, WHERE SLAG HAS BEEN USED FOR FILL, ROAD BASE, GRAVEL SURFACES, RAILROAD BALLAST OR OTHER USES. (PRP-2)

EPA'S RESPONSE: LEAD AND ARSENIC VALUES ARE NOT FOUND COMPLETELY RANDOMLY, BASED ON THE GEOSTATISTICAL RESULTS REPORTED IN THE RI ADDENDUM. SLAG USAGE MAY BE RANDOM IN THE MIDVALE AREA, AND MAY THEREFORE REPRESENT A COMPONENT OF THE RANDOM VARIABILITY DETERMINED IN THE GEOSTATISTICAL ANALYSES. HOWEVER, THE NON-RANDOM, REGIONAL PATTERN OF CONTAMINANT CONCENTRATIONS IS STILL PRESENT IN THE DATA.

L.10 COMMENT: THE CHARACTERIZATION OF METALS VALUES IN THE RI ADDENDUM, RELATING THEM TO WIND DISPERSION FROM THE TAILINGS AND SMELTER SITES, IS INCONSISTENT WITH ATTEMPTS TO RECONCILE DISPERSION MODELING FROM THESE SITES WITH OFF-SITE METALS VALUES. (PRP-2)

EPA'S RESPONSE: THE RI ADDENDUM (1) SUGGESTS THAT WIND DISPERSION MAY BE THE PRIMARY MECHANISM; (2) SUGGESTS THAT MECHANICAL DISPERSION OF TAILINGS AND SLAG MAY BE IMPORTANT; AND (3) ACKNOWLEDGES THAT RANDOM DEPOSITION AND/OR DISTURBANCE IS ALSO A COMPONENT. ATTEMPTS TO MODEL THE DEPOSITION IN THE MIDVALE AREA MUST TAKE INTO CONSIDERATION ALL OF THESE COMPONENTS.

L.11 COMMENT: OVERESTIMATION OF THE BLOOD-LEAD LEVEL IS DUE TO AN ERROR IN THE CALCULATION OF BLOOD-LEAD DISTRIBUTIONS INHERENT IN EPA'S SOFTWARE VERSION OF THE INTEGRATED UPTAKE/BIOKINETIC MODEL (IU/BK OR THE LEAD PROGRAM). (PRP T)

EPA'S RESPONSE: THERE IS AN ERROR IN THE SOFTWARE USED TO GENERATE THE BLOOD-LEAD DISTRIBUTIONS. HOWEVER, EPA ALSO USED A GEOMETRIC STANDARD DEVIATION MUCH LESS THAN THAT ACTUALLY MEASURED IN THE MIDVALE COMMUNITY. ALTHOUGH THE ERROR IN THE SOFTWARE WOULD ALLOW FOR A HIGHER ACTION LEVEL, THE ACTUAL VARIABILITY IN THE MIDVALE POPULATION WOULD SUGGEST A COMPENSATORY LOWERING OF THE ACTION LEVEL TOWARD THE ORIGINAL ACTION LEVEL. INITIAL CALCULATIONS BY EPA SUGGEST THAT 500 PPM MAY STILL BE APPROPRIATE. FOR EXAMPLE, USING THE MEAN SOIL, DUST, AND WATER-LEAD LEVELS FOUND IN THE MIDVALE STUDY AND APPLYING THE MIDVALE-SPECIFIC GEOMETRIC STANDARD DEVIATION, THE MODEL, CORRECTING FOR THE SOFTWARE ERROR, PREDICTS THAT 5 PERCENT OF THE CHILDREN SHOULD HAVE BLOOD-LEAD LEVELS OF 11 UG/DL (MICROGRAMS PER DECILITER). ACTUALLY, ABOUT 8 PERCENT OF THE CHILDREN IN THE RANDOM STUDY EXCEEDED THIS LEVEL. INCREASING SOIL-LEAD LEVELS FROM THE MIDVALE STUDY MEAN TO 500 SUGGESTS THAT 5 PERCENT OF THE CHILDREN WOULD HAVE BLOOD-LEAD LEVELS EXCEEDING 12.3 UG/DL SINCE THE MODEL UNDERPREDICTS RESULTS FROM THE MIDVALE STUDY, IT IS INAPPROPRIATE TO INCREASE THE ACTION LEVEL SLIGHTLY TO REACH THE 95 PERCENTILE LEVEL AT 12.5 UG/DL. THUS, RE-EVALUATION SUGGESTS THAT ACTION LEVELS REMAIN UNCHANGED.

L.12 COMMENT: OVERESTIMATION OF THE BLOOD-LEAD LEVEL IS DUE TO THE USE OF INAPPROPRIATE EXPOSURE ASSUMPTIONS. (PRP 1)

EPA'S RESPONSE: THE ASSUMPTIONS USED IN THE MODEL HAVE BEEN VALIDATED AT OTHER SITES AND ARE CONSISTENT WITH BIOAVAILABILITY STUDIES PERFORMED ON THE TAILINGS MATERIAL FROM THE SITE. EPA BELIEVES THAT THE EXPOSURE ASSUMPTIONS ARE APPROPRIATE.

L.13 COMMENT: OVERESTIMATION OF THE BLOOD-LEAD LEVEL IS DUE TO THE REPRESENTATION OF A CALCULATED GEOMETRIC MEAN AS A "NOT TO BE EXCEEDED" LEVEL FOR LEAD AND SOIL. (PRP 1)

EPA'S RESPONSE: THE LEAD MODEL IS DESIGNED TO PREDICT THE DISTRIBUTION OF BLOOD-LEAD LEVELS IN A POPULATION OF CHILDREN ALL EXPOSED TO THE SAME LEVEL OF LEAD IN SOIL/DUST. A GEOMETRIC MEAN OF SOIL/DUST CONCENTRATION WORKS IN THE MODEL PRESUMABLY BECAUSE IT ESTIMATES THE AVERAGE EXPOSURE CONCENTRATION FOR A GIVEN POPULATION. AFTER THE IMPLEMENTATION OF A REMEDY AT THE SITE, A POPULATION OF CHILDREN LIVING AROUND THE PERIMETER OF THE CLEANUP AREA CAN BE ENVISIONED WHO WOULD BE EXPOSED AT A LEVEL AT OR NEAR THE CLEANUP LEVEL. IT IS THIS POPULATION WHICH IS MODELED IN THE ACTION LEVEL DOCUMENT. EPA BELIEVES THIS APPROACH IS APPROPRIATE TO PROTECT THE MOST EXPOSED INDIVIDUALS.

L.14 COMMENT: OVERESTIMATION OF THE BLOOD-LEAD LEVEL IS DUE TO THE NEAR-LINEARITY OF THE RELATIONSHIP BETWEEN SOIL-LEAD AND BLOOD-LEAD CONCENTRATIONS INHERENT IN THE LEAD PROGRAM. (PRP 1)

EPA'S RESPONSE: THE LINEARITY OF THE RELATIONSHIP HAS NOT PREVENTED THE MODEL FROM ACCURATELY PREDICTING BLOOD-LEAD CONCENTRATIONS IN OTHER COMMUNITIES. IN FACT, THE MODEL HAS SLIGHTLY UNDERPREDICTED BLOOD-LEAD LEVELS AT THE UPPER END OF THE BLOOD-LEAD DISTRIBUTION CURVE. EPA DOES NOT BELIEVE THAT THE LINEARITY RENDERS THE MODEL OVERLY CONSERVATIVE.

L.15 COMMENT: OVERESTIMATION OF THE ARSENIC ACTION LEVEL IS DUE TO THE USE OF AN INAPPROPRIATE ESTIMATE ON ARSENIC BIOAVAILABILITY. (PRP 1)

EPA'S RESPONSE: THE PRPS' ESTIMATES OF BIOAVAILABILITY MAY OR MAY NOT BE ACCURATE. EPA BELIEVES THAT INSUFFICIENT DATA EXIST TO WARRANT LOWERING CURRENT BIOAVAILABILITY ESTIMATES. EPA WILL CONTINUE TO USE CONSERVATIVE ESTIMATES UNTIL ADEQUATE DATA EXIST TO SUPPORT A REVISION.

L.16 COMMENT: OVERESTIMATION OF THE ARSENIC ACTION LEVEL IS DUE TO FAILURE TO MODIFY ARSENIC INGESTION RISKS DUE TO THE NON-LINEARITY OF THE ARSENIC DOSE-RESPONSE CURVE. (PRP 1)

EPA'S RESPONSE: EPA'S EVALUATION OF THE DATA DIFFERS FROM THAT OF THE PRPS. EPA BELIEVES THAT INSUFFICIENT EVIDENCE EXISTS FOR REDUCING THE ARSENIC SLOPE FACTOR AT LOW DOSES. THE EPA ADMINISTRATOR HAS OFFERED RISK MANAGERS THE OPTION OF SELECTING RISK LEVELS/ACTION LEVELS UP TO AN ORDER OF MAGNITUDE TO ACCOUNT FOR POTENTIAL UNCERTAINTIES IN THE ARSENIC SLOPE FACTOR. THE REGIONAL ADMINISTRATOR IS AWARE OF THIS OPTION.

L.17 COMMENT: OVERESTIMATION OF THE ARSENIC ACTION LEVEL IS DUE TO THE FRACTION OF ARSENIC-INDUCED SKIN CANCERS THAT ARE NONLETHAL. (PRP 1)

EPA'S RESPONSE: EPA DOES NOT CONSIDER SKIN CANCER LESS UNDESIRABLE SIMPLY BECAUSE IT IS GENERALLY LESS LETHAL.

L.18 COMMENT: OVERESTIMATION OF THE ARSENIC ACTION LEVEL IS DUE TO THE POSSIBLE NUTRITIONAL ESSENTIALITY OF ARSENIC. (PRP 1)

EPA'S RESPONSE: DATA TO SUPPORT NUTRITIONAL ESSENTIALITY OF ARSENIC ARE EXTREMELY WEAK. EPA CONSIDERS IT INAPPROPRIATE TO REGULATE ON THE BASIS OF A WEAKLY SUPPORTED POSSIBILITY.

L.19 COMMENT: THE SOIL ACTION LEVEL FOR ARSENIC SHOULD BE 700 PPM BASED ON THE ASSUMPTIONS IN THE COMMENTS ABOVE; INCORPORATION OF LOW DOSE NON-LINEARITIES, AND USING A TARGET RISK LEVEL OF (10-5) FOR LETHAL CANCERS. (PRP 1)

EPA'S RESPONSE: ANY DECISION ON CLEANUP LEVEL IS MADE BY THE REGIONAL ADMINISTRATOR. ALL COMMENTS ARE PART OF THE ADMINISTRATIVE RECORD AND WILL BE CONSIDERED IN THE FINAL DECISION ON CLEANUP LEVELS.

L.20 COMMENT: LEAD BIOAVAILABILITY IS DEMONSTRABLY LESS THAN EPA ESTIMATES. IN VITRO EVIDENCE SUGGESTS THAT THE 50 PERCENT GASTROINTESTINAL ABSORPTION FACTOR IS A GROSS OVERESTIMATION OF THE AMOUNT OF LEAD THAT WOULD BE ABSORBED AFTER INGESTION OF LEAD IN SOIL. (PRP 4)

EPA'S RESPONSE: EPA'S OWN BIOAVAILABILITY STUDIES SUPPORT AN AVERAGE VALUE OF ABOUT 25 PERCENT FOR ABSORPTION OF LEAD FROM MIDVALE TAILINGS. IN THIS STUDY, SOME ANIMALS ABSORBED SUBSTANTIALLY MORE THAN THIS PERCENTAGE, UP TO ABOUT 45 PERCENT. SINCE THE 50 PERCENT FIGURE IS INTENDED AS A REASONABLE MAXIMUM, RATHER THAN AN AVERAGE, IT IS APPROPRIATE IN ESTABLISHING A REASONABLE MAXIMUM BLOOD-LEAD LEVEL FOR THE COMMUNITY.

L.21 COMMENT: BLOOD-LEAD LEVELS IN MIDVALE RESIDENTS DO NOT INCREASE PROPORTIONALLY TO SOIL-LEAD LEVELS. THE ENVIRONMENTAL BLOOD-LEAD STUDY AT MIDVALE INDICATES THAT AS SOIL-LEAD CONCENTRATIONS INCREASE, THE RELATIONSHIP TO BLOOD-LEAD WILL NOT INCREASE AS RAPIDLY; I.E., THE SLOPE DECREASES WITH INCREASING SOIL-LEAD CONCENTRATIONS. WHEN THE IU/BK MODEL ASSUMES A LINEAR RELATIONSHIP, IT WILL OVERESTIMATE BLOOD-LEAD LEVELS AS SOIL LEVELS EXCEED 250-500 PPM RANGE. (PRP 4)

EPA'S RESPONSE: EPA BELIEVES THAT THE MIDVALE BLOOD-LEAD STUDY IS NOT SUFFICIENT BY ITSELF FOR ASSESSING POTENTIAL IMPACTS OF LEAD WASTES IN THE RESIDENTIAL AREA IN MIDVALE. HOWEVER, EPA IS RE-EVALUATING THE MIDVALE BLOOD-LEAD STUDY. THIS REEVALUATION WILL BE COMPLETE BEFORE ANY REMEDY IS IMPLEMENTED.

L.22 COMMENT: THE TARGET BLOOD-LEAD LEVEL OF 12.5 UG/DL, THE MIDPOINT OF THE 10-15 UG/DL RANGE, IS TOO HIGH, BECAUSE THE RANGE IT REPRESENTS IS THE LEVEL WHERE NEUROBEHAVIORAL EFFECTS OCCUR FOR PRENATAL EXPOSURES. COMPARABLE NEUROBEHAVIORAL EFFECTS FROM POSTNATAL EXPOSURES OCCUR AT HIGHER BLOOD-LEAD LEVELS (10-30 UG/DL). THEREFORE, THE PRPS ASSERT THAT EPA SHOULD SELECT A BLOOD-LEAD TARGET FOR CHILDREN AT OR ABOVE THE UPPER END OF THIS RANGE; I.E., 15 UG/DL OR HIGHER.

FURTHER, THE AUTHORS OF THE IU/BK MODEL USED AN INCORRECT EQUATION TO DESCRIBE THE BLOOD-LEAD DISTRIBUTION GIVEN A GEOMETRIC MEAN AND GEOMETRIC STANDARD DEVIATION. FROM EXAMINATION OF A LOTUS SPREADSHEET VERSION OF THE LEAD PROGRAM, THE AUTHORS APPARENTLY OMITTED THE VARIABLE "X" AND USED THE GEOMETRIC STANDARD DEVIATION (GSD) INSTEAD OF THE NATURAL LOG OF THE GSD IN THE DENOMINATOR. THE DISTRIBUTION OF X CAN BE FOUND FROM THE RELATIONSHIP GIVEN BY HAAN (1977). THE RESULTING EQUATION OVERPREDICTS THE PERCENTAGES OF CHILDREN PREDICTED TO HAVE BLOOD-LEAD LEVELS GREATER THAN 12.5 UG/DL AND THEREBY UNDEPREDICTS THE SOIL-LEAD LEVEL THAT IS PROTECTIVE OF 95 PERCENT OF THE POPULATION. (PRP 1)

EPA'S RESPONSE: EPA DISAGREES WITH THE PRPS' CONCLUSION THAT THE RISK RANGE FOR CHILDREN 0 TO 6 YEARS OF AGE SHOULD BE GREATER THAN THAT FOR PRENATAL EXPOSURE. EPA HAS CAREFULLY CONSIDERED ALL AVAILABLE INFORMATION SEVERAL TIMES IN THE LAST 2 TO 3 YEARS AND FEELS THAT THE DATA SUPPORT EPA'S DECISION TO ESTABLISH A LEVEL OF CONCERN OF 10 TO 15 FOR POSTNATAL EXPOSURE. SELECTION OF THE MIDPOINT OF THIS RANGE IS CONSIDERED REASONABLE.

L.23 COMMENT: EPA'S ESTIMATED DUST EXPOSURE CONCENTRATIONS ARE NOT REFLECTIVE OF ACTUAL CONDITIONS IN MIDVALE. SEVERAL SIGNIFICANT SOURCES OF UNCERTAINTY ARE APPARENT IN THE BASELINE RISK ASSESSMENT APPROACH FOR ESTIMATING DUST CONCENTRATIONS, NAMELY: (PRP 4)

1) TWO EQUATIONS ARE USED TO DETERMINE INDOOR DUST CONCENTRATIONS OF LEAD; ONE FOR POINT AND ONE FOR NON-POINT. THE BASELINE RISK ASSESSMENT PROVIDES NO JUSTIFICATION FOR USING THE ROOT MEAN SQUARE WHEN COMBINING THE POINT AND NONPOINT SOURCES OF DUST IN LEAD.

- 2) THE BASELINE RISK ASSESSMENT DOES NOT EXPLAIN HOW POINT SOURCES; I.E., THE SMELTERS, WHICH HAVE NOT BEEN ACTIVE AT THE SITE FOR OVER 30 YEARS, ARE STILL CONSIDERED TO SIGNIFICANTLY AFFECT CURRENT AND FUTURE DUST LEVELS IN HOUSE.
- 3) THE EQUATION USED TO DEVELOP DUST CONCENTRATIONS FOR NON-POINT SOURCES IS DERIVED FROM A DATASET OF ONLY FIVE POINTS; THE INTERCEPT FOR THIS EQUATION SHOULD BE ZERO IN THE ABSENCE OF INDOOR SOURCES OF LEAD. THE HIGH CONSTANT IN THE EQUATION DOES NOT ADEQUATELY MODEL DUST CONCENTRATION AT SOIL-LEAD LEVELS LESS THAN 600-1000 MG/KG (PPM).
- 4) THE MIDVALE COMMUNITY LEAD STUDY (MCLS) REFLECTS SITE-SPECIFIC CONDITIONS SO THE BASELINE RISK ASSESSMENT SHOULD USE THE REGRESSION EQUATION FOR SOIL-LEAD AND INDOOR DUST LEAD PRESENTED IN THE MCLS. EPA'S EQUATION OVERESTIMATES THE RELATION OF SOIL-LEAD LEVELS TO INDOOR DUST LEAD LEVELS.

EPA'S RESPONSE: ALTHOUGH IT IS TRUE THAT THE MODEL FOR NON-POINT SOURCES WAS BASED ON ONLY FIVE DATA POINTS, THIS METHODOLOGY FOR CALCULATING LEAD LEVELS IN INDOOR DUST HAS RECENTLY BEEN INDEPENDENTLY VALIDATED. FOUR MODELS, INCLUDING THE MODEL USED IN THE BASELINE RISK ASSESSMENT; A LOGARITHMIC REGRESSION OF THE BARLTROP DATA, WHICH WAS THE BASIS OF THE LINEAR MODEL USED IN THE BASELINE RISK ASSESSMENT; A MODEL BASED ON THE MIDVALE COMMUNITY BLOOD STUDY OF BORNSEIN; AND A MODEL SUGGESTED BY THE PRPS FOR USE AT THE BUTTE AREA SUPERFUND SITE. EACH OF THESE MODELS WAS TESTED AGAINST AN INDEPENDENT DATA SET (HARPER ET AL., 1987) BASED ON DATA FROM THE UNITED KINGDOM. THE LINEAR MODEL, BASED ON BARLTROP ET AL., OVERPREDICTED THE ACTUAL RESULTS FROM THE INDEPENDENT AT BY 5.3 PERCENT, THE LOGARITHMIC MODEL UNDERPREDICTED THE ACTUAL RESULTS BY 8.6 PERCENT, BORNSEIN'S MODEL UNDERPREDICTED THE ACTUAL RESULTS BY 19 PERCENT, AND THE PRPS' MODEL UNDERPREDICTED THE ACTUAL RESULTS BY 13 PERCENT. THESE RESULTS CLEARLY DEMONSTRATE THAT THE MODEL USED IN THE BASELINE RISK ASSESSMENT WAS APPROPRIATE. FOR TWO VALUES, THE ROOT MEAN SQUARE IS EQUIVALENT TO THE GEOMETRIC MEAN, WHICH IS AN APPROPRIATE STATISTIC TO DESCRIBE THE AVERAGE DUST CONCENTRATION. ALTHOUGH THE SMELTER HAS NOT BEEN ACTIVE FOR A LONG PERIOD OF TIME, THE PRIMARY SOURCE OF PARTICLES COULD HAVE BEEN THE SMELTER, AS WELL AS THE TAILINGS PILES. THEREFORE, IT WAS APPROPRIATE TO INCLUDE BOTH POINT AND NON-POINT SOURCES.

L.24 COMMENT: THE INCONSISTENCIES ABOVE WERE ALSO APPLIED TO INDOOR ARSENIC AND CADMIUM LEVELS. THIS METHODOLOGY FOR ESTIMATING INDOOR DUST CONCENTRATIONS IS DEMONSTRABLY ERRONEOUS, ESPECIALLY FOR ARSENIC AND CADMIUM FOR WHICH NO INDOOR SOURCES HAVE BEEN IDENTIFIED. USING REGRESSION ANALYSES BASED UPON LEAD DATA AS THE EQUATION USED TO MEASURE ARSENIC AND CADMIUM LEVELS IN INDOOR DUST IS INAPPROPRIATE AND GROSSLY OVERESTIMATES THEIR CONCENTRATIONS. (PRP 4)

EPA'S RESPONSE: EPA HAS BEEN EVALUATING DATA FOR LEAD, ARSENIC, AND CADMIUM DUST LEVELS AND PLANS TO COLLECT ADDITIONAL DATA AT OTHER SITES WITHIN REGION VIII. THE ACTION LEVEL DOCUMENT FOR THE RESIDENTIAL SOILS REPRESENTS REGION VIII'S ATTEMPT TO USE CURRENTLY AVAILABLE INFORMATION TO ESTABLISH CLEANUP LEVELS FOR LEAD, ARSENIC, AND CADMIUM. AS ADDITIONAL SAMPLING INFORMATION BECOMES AVAILABLE, IT WILL BE INCORPORATED APPROPRIATELY. THE ACTION LEVEL DOCUMENT DOES CONCLUDE, THOUGH, THAT NO CADMIUM SOIL CLEANUP LEVEL NEEDS TO BE ESTABLISHED BASED ON THE RELATIVELY LOW MEAN CADMIUM CONCENTRATION IN RESIDENTIAL SOILS IN MIDVALE OBSERVED.

L.25 COMMENT: THE ESTIMATED BLOOD-LEAD LEVEL IN A TWO-YEAR-OLD DUE TO INGESTION OF BACKGROUND DUST WOULD BE 15.2 UG/DL (PRP 4)

EPA'S RESPONSE: THE PRPS INAPPROPRIATELY APPLY ESTIMATES OF INDOOR DUST CONCENTRATIONS FROM A SITE ADJACENT TO AN OLD SMELTER AND A LARGE TAILINGS PILE TO A "BACKGROUND" AREA.

L.26 COMMENT: THE ESTIMATED BLOOD-LEAD LEVEL IN A TWO-YEAR-OLD DUE TO VEGETABLE INGESTION WOULD BE 2 UG/DL. (PRP 4)

EPA'S RESPONSE: EPA CANNOT REPRODUCE THE PRPS' FIGURES, BUT EPA ESTIMATES A TOTAL LEAD INTAKE OF ABOUT 11 UG (MICROGRAMS) OF LEAD PER DAY ON DAYS WHEN HOMEGROWN PRODUCE ARE CONSUMED. THIS IS EQUIVALENT TO 5.5 UG OF LEAD ABSORBED IN THE GASTROINTESTINAL TRACT PER DAY. WHEN AMORTIZED, AS IN THE BASELINE RISK ASSESSMENT, OVER A YEAR, THE IMPACT ON BLOOD LEAD WOULD BE ABOUT 0.3 UG/DL THIS IS MUCH LESS THAN CURRENT ESTIMATES OF DIETARY IMPACTS ON BLOOD-LEAD LEVELS IN THE US DUE TO VEGETABLE CONSUMPTION. THUS, THE BASELINE RISK ASSESSMENT METHODOLOGIES PREDICT THAT, AT A SOIL LEVEL OF 20 PPM, USE OF HOME VEGETABLES WOULD NOT HAVE ANY ADDITIONAL IMPACT ON BLOOD-LEAD LEVELS. EVEN AT 200 PPM, THE PREDICTED IMPACT ON BLOOD-LEAD LEVELS, AVERAGED OVER A YEAR AS DONE IN THE BASELINE RISK ASSESSMENT, IS ABOUT 3 UG/DL. THE PRPS' CALCULATIONS APPEAR TO BE OFF BY AT LEAST AN ORDER OF MAGNITUDE.

L.27 COMMENT: THE TOTAL BLOOD-LEAD VALUE DUE TO THE COMBINED EXPOSURE FROM DUST AND VEGETABLE INGESTION AVERAGES 20 UG/DL. THIS IS DERIVED USING EPA'S METHODOLOGIES FROM THE BASELINE RISK ASSESSMENT ON BACKGROUND SOIL-LEAD CONCENTRATIONS OF 20 PPM. THIS 20 UG/DL BASELINE FOR CHILDREN IS NOT CONSISTENT WITH BLOOD-LEAD LEVELS PROJECTED FOR CHILDREN IN THE US AT THE PRESENT TIME AND IS WELL ABOVE EPA'S CURRENT RANGE OF CONCERN. APPLICATION OF BASELINE RISK ASSESSMENT METHODOLOGIES TO BACKGROUND CONDITIONS ESTABLISHES THAT EPA'S RISK

ANALYSIS IS SERIOUSLY FLAWED. (PRP 4)

EPA'S RESPONSE: EPA BELIEVES THAT THE PRPS HAVE MISUSED THE BASELINE RISK ASSESSMENT METHODOLOGIES. MOREOVER, THE PRPS CONTINUE TO MISCONSTRUE THE INTENT OF THE BASELINE RISK ASSESSMENT CALCULATIONS. IT IS INAPPROPRIATE TO COMPARE AVERAGE BLOOD-LEAD LEVELS WITH THE PREDICTIONS IN THE BASELINE RISK ASSESSMENT WHICH ARE CLEARLY INTENDED TO BE ESTIMATES OF MAXIMUM POSSIBLE CONCENTRATIONS. THE BASELINE RISK ASSESSMENT CLEARLY INDICATES THAT THESE NUMBERS WOULD BE EXPECTED IN ONLY A SMALL FRACTION OF THE POPULATION. TO QUOTE THE RISK ASSESSMENT GUIDANCE FOR SUPERFUND (RAGS), "THE INTENT OF THE REASONABLE MAXIMUM EXPOSURE (RME) IS TO ESTIMATE A CONSERVATIVE EXPOSURE CASE (I.E., WELL ABOVE THE AVERAGE) THAT IS STILL WITHIN THE RANGE OF POSSIBLE EXPOSURES." THUS, THE PRPS' ANALYSIS DOES NOT ESTABLISH THAT THE BASELINE RISK ASSESSMENT METHODOLOGIES IS "SERIOUSLY FLAWED."

L.28 COMMENT: THE BASELINE RISK ASSESSMENT ASSUMPTION FOR ADULT/CHILD CONSUMPTIONS OF VEGETABLES ARE HIGHER THAN THOSE RECOMMENDED IN THE EXPOSURE FACTORS HANDBOOK AND LEAD TO UNNECESSARILY CONSERVATIVE RISK DETERMINATIONS, APPROXIMATELY FIVE TIMES THAT WHICH WOULD BE FOUND WITH PROPER APPLICATION OF THE RISK ASSESSMENT GUIDANCE FOR SUPERFUND METHODS. (PRP 4)

EPA'S RESPONSE: EPA BELIEVES ITS SELECTION OF QUANTITIES OF VEGETABLES CONSUMED IS CONSISTENT WITH THE EXPOSURE FACTORS HANDBOOK AND WITH THE KNOWN CULTURAL EMPHASIS ON GARDENING IN UTAH. THE NUMBERS IN THE BASELINE RISK ASSESSMENT (159 G/DAY FOR VINE CROPS; 144 G/DAY FOR LEAF CROPS; AND 114 G/DAY FOR ROOT CROPS, ON 52 DAYS PER YEAR) TRANSLATE INTO A YEARLY AVERAGE CONSUMPTION OF 22 G/DAY OF VINE CROPS. TABLE 2-10 IN THE EXPOSURE FACTORS HANDBOOK SUGGESTS THAT THE AVERAGE, 50TH PERCENTILE, CONSUMPTION OF HOMEGROWN TOMATOES IS 14.6 G/DAY. SINCE THE NUMBER IN THE BASELINE RISK ASSESSMENT IS INTENDED TO REPRESENT ALL VINE CROPS, IT IS DIFFICULT TO SEE HOW 22 G/DAY IS EITHER HIGHER THAN THAT RECOMMENDED IN EPA GUIDANCE OR AN IMPROPER APPLICATION OF THE RISK ASSESSMENT GUIDANCE FOR SUPERFUND METHODS. IN ADDITION, EPA AND ITS CONTRACTORS ALSO CONDUCTED SEVERAL DISCUSSIONS WITH LOCAL AND STATE OFFICIALS WHO CONFIRMED THAT THE INGESTION RATES WERE APPROPRIATE.

L.29 COMMENT: THE BASELINE RISK ASSESSMENT STATES THAT IT HAS APPLIED THE ASSUMPTION THAT A CHILD INGESTS HOMEGROWN VEGETABLES TWO DAYS PER WEEK. THE IU/BK MODEL DOES NOT ACCOUNT FOR THIS EXPOSURE FACTOR, AND IN EFFECT, ASSUMES SEVEN DAY/WEEK EXPOSURE. THIS RESULTS IN THE INAPPROPRIATE PREDICTION AND WILL LIKELY OVERESTIMATE ACTUAL BLOOD-LEAD LEVELS BY AS MUCH AS A FACTOR OF 3.5. (PRP 4)

EPA'S RESPONSE: THE PRPS INCORRECTLY INTERPRET THE MEANING OF THE TWO DAYS/WEEK EXPOSURE. IT IS INTENDED AS A MEANS OF SIMPLIFYING THE EXPOSURE ASSUMPTIONS FOR INTRODUCTION INTO THE MODEL, NOT AS A "REAL LIFE" PREDICTION OF USE PATTERNS OF HOME GARDENERS. IT IS NOT UNREASONABLE TO ASSUME THAT ACTUAL VEGETABLE CONSUMPTION WILL BE SPREAD OUT IN THE WEEK. FOR EXAMPLE, A FAMILY MIGHT EAT A FRESH SALAD ONE NIGHT (LEAFY CROPS), COOKED CARROTS ANOTHER NIGHT (ROOT CROP), ETC. IT IS HIGHLY PROBABLE THAT AVERAGING OVER A WEEK IS A MUCH MORE ACCURATE REPRESENTATION OF ACTUAL USE PATTERNS.

L.30 COMMENT: STUDIES HAVE SHOWN THAT ONLY ABOUT 10 PERCENT OF ARSENIC CONTENT OF VEGETABLES IS INORGANIC, 90 PERCENT BEING ORGANIC. SINCE THE CANCER POTENCY FACTOR IS BASED UPON INORGANIC ARSENIC ONLY, THE CANCER RISK BASED ON VEGETABLE CONSUMPTION IS OVERESTIMATED IN THE BASELINE RISK ASSESSMENT AT LEAST BY A FACTOR OF 10. (PRP 4)

EPA'S RESPONSE: THERE MAY BE SOME OVERESTIMATION OF EXPOSURE TO INORGANIC ARSENIC BY THE METHODS USED IN THE BASELINE RISK ASSESSMENT. HOWEVER, IT IS NOT CLEAR THAT THE DATA CITED APPLY TO PLANTS EXPOSED TO MUCH HIGHER CONCENTRATIONS OF ARSENIC THAN THAT FOUND IN "UNCONTAMINATED" SOILS. THUS, EPA WILL CONTINUE TO USE A CONSERVATIVE APPROACH UNTIL DATA ARE AVAILABLE TO SUPPORT A SPECIFIC CORRECTION FACTOR. AS MENTIONED PREVIOUSLY, THE ONLY SITE-SPECIFIC DATA AVAILABLE FOR THE SHARON STEEL/MIDVALE SITE SUGGEST THAT THE UPTAKE OF LEAD, ARSENIC, AND CADMIUM ARE ALL ACCURATELY MODELED IN ME BASELINE RISK ASSESSMENT.

L.31 COMMENT: THE LEAD MODEL ASSUMES A LINEAR RELATIONSHIP BETWEEN SOIL-LEAD AND BLOOD-LEAD. HOWEVER, EPIDEMIOLOGICAL DATA INDICATE THAT THE RELATIONSHIP CAN BE NONLINEAR, PARTICULARLY AT LOWER SOIL-LEAD CONCENTRATIONS (50 TO 500 PPM). AS SOIL-LEAD CONCENTRATIONS INCREASE, THE LEAD PROGRAM INCREASINGLY OVERESTIMATES BLOOD-LEAD LEVELS, WHICH RESULTS IN INCREASINGLY CONSERVATIVE SOIL-LEAD CLEANUP LEVELS. IN ADDITION, THE VARIABLE SLOPE SUGGESTS THAT THE BIOAVAILABILITY OF LEAD DECREASES WITH INCREASING SOIL-LEAD CONCENTRATIONS. (PRP 1)

EPA'S RESPONSE: THE LINEARITY OF THE RELATIONSHIP HAS NOT PREVENTED THE MODEL FROM ACCURATELY PREDICTING BLOOD-LEAD CONCENTRATIONS IN OTHER COMMUNITIES. IN FACT, THE MODEL HAS SLIGHTLY UNDERPREDICTED BLOOD-LEAD LEVELS AT THE UPPER END OF THE BLOOD-LEAD DISTRIBUTION CURVE. EPA DOES NOT BELIEVE THAT THE LINEARITY RENDERS THE MODEL OVERLY CONSERVATIVE.

L.32 COMMENT: SITE-SPECIFIC INFORMATION ON ARSENIC BIOAVAILABILITY AND ON LOW DOSE NON-LINEARITY AND NON-LETHALITY OF ARSENIC-INDUCED SKIN CANCER (10-FOLD REDUCTION IN RISK) MUST BE ADDRESSED IN CALCULATION OF RISKS FOR THE SITE AND IN THE DERIVATION OF CLEANUP LEVELS.

AS NOTED IN EPA DOCUMENTS, ARSENIC BIOAVAILABILITY VARIES WITH THE FORM, THE SOLUBILITY, AND THE MEDIUM IT IS CONTAINED IN. THERE IS A SIGNIFICANT AMOUNT OF RESEARCH THAT SUGGESTS ARSENIC BIOAVAILABILITY IN SOIL IS MUCH LESS AND THE 80 PERCENT ESTIMATE USED BY EPA IS OVERLY CONSERVATIVE. A STUDY USING CONTAMINATED MINE WASTE (JOHNSON ET AL., 1990) SUGGESTS ARSENIC BIOAVAILABILITY ON THE ORDER OF 10-20 PERCENT. THEREFORE, IN THE ABSENCE OF SITE-SPECIFIC DATA, THE APPROPRIATE BIOAVAILABILITY OF ARSENIC IN SOILS IS 25 PERCENT OR LESS. (PRP 4)

EPA'S RESPONSE: EPA BELIEVES THAT ITS CHOICES FOR SOIL INGESTION RATES, BIOAVAILABILITY, AND PROPORTION OF TIME SPENT OUTDOORS ARE APPROPRIATE FOR ESTIMATION OF A REASONABLE MAXIMUM EXPOSURE. AS STATED BEFORE, ESTIMATION OF DUST CONCENTRATIONS IS THE SUBJECT OF CONTINUING STUDY IN REGION VIII. THIS STUDY WILL INCLUDE EXAMINATION OF THE DATA FROM THE MIDVALE BLOOD-LEAD STUDY. MOREOVER, THE STUDY CITED (JOHNSON ET AL.) HAS NOT APPEARED IN THE PEER-REVIEWED LITERATURE AND CANNOT BE EVALUATED BY EPA AT THIS TIME.

L.33 COMMENT: LEAD ABSORPTION FACTORS OF 30 PERCENT FOR AN AVERAGE CHILD AND 50 PERCENT FOR THE REASONABLE MAXIMUM EXPOSURE CHILD ARE HIGH. RECENT INVESTIGATIONS FOR ARCO BY DRS. DONALD LANGMUIR AND RONALD KLUSMAN ON TAILINGS WITH PARTICLE SIZES MOST LIKELY TO ADHERE TO A CHILD'S HANDS INDICATES THAT A SOLUBILITY IN HYDROCHLORIC ACID AT PH 2 IS LESS THAN 1 PERCENT. CALIBRATION OF THE IU/BK MODEL WITH DATA FROM THE MIDVALE COMMUNITY LEAD STUDY YIELDS ESTIMATES OF BIOAVAILABILITY OF LESS THAN 15 PERCENT. (PRP 1)

EPA'S RESPONSE: EPA BELIEVES THAT THE STUDIES CITED CANNOT BE DIRECTLY EXTRAPOLATED TO SOLUBILITY IN HUMAN GASTRIC ACID. MOREOVER, THE STUDY CITED SHOWED THAT UP TO 42 PERCENT OF TOTAL LEAD LEACHED FROM TAILINGS IN SOME SAMPLES AND THAT 10 PERCENT OF THE VALUES WERE OVER 30 PERCENT. EPA IS CURRENTLY CONDUCTING STUDIES DESIGNED TO GIVE A MORE ACCURATE MEASURE OF SOLUBILITY IN THE HUMAN STOMACH. MOREOVER, THE BIOAVAILABILITY STUDY CONDUCTED BY EPA DEMONSTRATES THAT ON THE AVERAGE 20 TO 25 PERCENT OF THE LEAD IN MIDVALE SURFICIAL TAILINGS IS ABSORBED AFTER ORAL DOSING. THIS VALUE IS VERY SIMILAR TO THE AVERAGE VALUE (30 PERCENT) USED AS A DEFAULT IN THE MODEL TO SET ACTION LEVELS. (SEE ALSO RESPONSES TO PREVIOUS COMMENTS TO BIOAVAILABILITY STUDIES.)

L.34 COMMENT: THE BASELINE RISK ASSESSMENT SUBSTANTIALLY OVERESTIMATES LEVELS OF RISK BECAUSE 90 PERCENT OF THE LEAD IN THE OFF-SITE SOILS OCCURS IN SLAG, WHICH IS INSOLUBLE IN HUMAN GASTRIC ACIDS. LEAD OCCURS IN THE GLASSY PORTION OF SLAG AND IS THEREFORE RELATIVELY INSOLUBLE. AS SUCH, THE LEAD IN THE SLAG DOES NOT POSE A RISK IN MIDVALE BECAUSE IT HAS AN EXTREMELY LOW BIOAVAILABILITY. LIKEWISE, THE ARSENIC SOILS LEVELS DO NOT POSE A HEALTH RISK BECAUSE 90 PERCENT OF THE ARSENIC IN THE OFF-SITE SOILS OCCURS IN INSOLUBLE SLAG. (PRP 2)

EPA'S RESPONSE: EPA DOES NOT AGREE WITH THE PRPS' ASSESSMENT OF SOURCE CONTRIBUTIONS (SEE PREVIOUS RESPONSES TO COMMENTS). MOREOVER, INVESTIGATIONS BY EPA DEMONSTRATE THAT THE GLASSY PORTION OF SLAG IN SMALL (INGESTIBLE) PARTICLES IS FRIABLE AND WILL BREAK DOWN IN MIDVALE SOIL, RELEASING IMBEDDED LEAD OXIDES. PARENTHETICALLY, SURFICIAL LEAD SULFIDE PARTICLES IN TAILINGS ARE EXPECTED TO UNDERGO OXIDATION TO MORE SOLUBLE OXIDES AND CARBONATES, AND EPA STUDIES INDICATE THAT THIS HAS OCCURRED. THUS, THE QUESTION OF SOURCE MAY BE MOOT IN TERMS OF BIOAVAILABILITY ARGUMENTS, SINCE ALL LEAD MAY EVENTUALLY END UP IN RELATIVELY SOLUBLE OXIDES AND CARBONATES. (SEE ALSO RESPONSES DESCRIBING THE EPA BIOAVAILABILITY STUDY.)

L.35 COMMENT: EPA HAS CONCLUDED THAT OU2 CURRENTLY POSES A RISK TO HUMAN HEALTH. NO ASSESSMENT OF RISK RELATED TO THE COMPLETION OF REMEDIAL ACTIONS HAS BEEN COMPLETED BY EPA. THE RISKS POSED BY THE COMPLETION OF THE PREFERRED REMEDY CONTRAST SHARPLY WITH CURRENT RISKS. THE RISKS RELATED TO SUCH ACTIVITIES AS HEAVY EQUIPMENT USE, MATERIALS TRANSPORT, AND TRAVEL ARE SUBSTANTIALLY HIGHER THAN ANY PUBLIC HEALTH AND ENVIRONMENTAL RISK POSED BY THE PRESENCE OF CONTAMINANTS IN THE MIDVALE COMMUNITY. (PRP 1)

AS SEEN IN THE ESTIMATIONS OF OCCUPATIONAL AND TRAFFIC ACCIDENT RISKS, SITE REMEDIATION IN ITSELF IMPOSES ADDITIONAL RISKS UPON THOSE ALREADY EXISTING AT THE SITE. THE RISKS CURRENTLY IMPOSED ON NEARBY RESIDENTS FROM EXPOSURE ARE A 1 IN 10,000 CHANCE IN A 70-YEAR LIFETIME OF CONTRACTING CANCER. IN CONTRAST, 0.015 OCCUPATIONAL FATALITIES ARE ESTIMATED TO OCCUR AND 1.9 PERSONS ARE ESTIMATED TO BE KILLED IN REMEDIATION-RELATED TRAVEL. (PRP 1)

EPA'S RESPONSE: EPA IS ALWAYS COMMITTED TO REDUCING REMEDY-RELATED RISKS TO A MINIMUM, AND THOUGH THE PRPS ARE CORRECT IN CONSIDERING REMEDY-RELATED RISKS, EPA BELIEVES THEIR ANALYSIS IS FLAWED. FOR EXAMPLE, THE PRPS HAVE NOT CONSIDERED ALL RISKS PRESENT IN THE RESIDENTIAL SOILS (E.G., RISKS TO LEAD HAVE BEEN IGNORED). IN ADDITION, THE PRPS' ANALYSIS FAILS TO ACKNOWLEDGE THAT SITE-SPECIFIC RISKS NEED TO BE EVALUATED FAR INTO THE FUTURE, WHEREAS REMEDY RELATED RISKS OCCUR ONLY DURING THE SHORT TIME WHEN THE REMEDY IS IMPLEMENTED. THE PRPS' CALCULATIONS GREATLY DISTORT RELATIVE RISKS.

L.36 COMMENT: EPA INCORRECTLY COMPUTED REASONABLE MAXIMUM EXPOSURES AT THE SITE BECAUSE IT SUMMED MULTIPLE PATHWAYS AND USED UPPER BOUND EXPOSURES THAT MAY BE ABOVE THE RANGE OF POSSIBLE EXPOSURES.

THE BASELINE RISK ASSESSMENT SUMS REASONABLE MAXIMUM EXPOSURES FOR SEVERAL DIFFERENT PATHWAYS WHEN DETERMINING TOTAL RISK AT THE SITE. ACCORDING TO THE RISK ASSESSMENT GUIDANCE FOR SUPERFUND, EPA 1989, SECTION 8.3.1, THE RISK ASSESSOR MUST "EXAMINE WHETHER IT IS LIKELY THAT THE SAME INDIVIDUALS WOULD

CONSISTENTLY FACE THE REASONABLE MAXIMUM EXPOSURE BY MORE THAN ONE PATHWAY" AND SHOULD DO SO ONLY IF IT CAN BE EXPLAINED WHY THE KEY REASONABLE MAXIMUM EXPOSURE ASSUMPTIONS FOR MORE THAN ONE PATHWAY APPLY TO THE SAME INDIVIDUAL OR SUBPOPULATION. THE BASELINE RISK ASSESSMENT PROVIDES NO JUSTIFICATION FOR THE SUMMING OF THE REASONABLE MAXIMUM EXPOSURES OVER DIFFERENT PATHWAYS.

EPA'S RESPONSE: EPA BELIEVES THAT THE EXPOSURES EVALUATED IN THE BASELINE RISK ASSESSMENT ARE MOST LIKELY TO BE CONCURRENT, RATHER THAN SEPARATE AND INDEPENDENT. THUS, IT SEEMS REASONABLE TO COMBINE RISKS FROM THESE PATHWAYS. A POTENTIAL EXCEPTION IS EXPOSURE VIA HOMEGROWN PRODUCE. HOWEVER, BECAUSE OF STRONG CULTURAL INFLUENCES, EPA BELIEVES THAT VEGETABLE GARDENING IS A LIKELY CONCURRENT RISK FOR THE MIDVALE COMMUNITY, AND, HENCE, COMBINING THIS RISK WITH OTHERS IS REASONABLE.

L.37 COMMENT: THE USE OF UPPER BOUND VALUES FOR EACH OF THE INTAKE FACTORS WILL LEAD TO DIFFERENT DEGREES OF CONSERVATIVENESS BETWEEN SCENARIOS DEPENDING ON THE NUMBER OF INTAKE FACTORS IN EACH SCENARIO. A SCENARIO BASED ON FIVE UPPER BOUND EXPOSURE PARAMETERS WILL BE MORE CONSERVATIVE.

CONSIDERATION WAS NOT APPROPRIATELY GIVEN TO THE RELATIVE LIKELIHOOD OF EACH EXPOSURE SCENARIO TO OCCUR WHEN APPLYING THESE SERIES OF CONSERVATIVE ASSUMPTIONS. USE OF THESE EXPOSURE SCENARIOS AND UPPER BOUND EXPOSURE VALUES ALMOST CERTAINLY RESULTED IN THEORETICAL EXPOSURES THAT ARE ABOVE THE RANGE OF POSSIBLE EXPOSURES AND ARE THEREFORE NOT REASONABLE. (PRP 4)

EPA'S RESPONSE: THE PRPS' ANALYSIS IS SIMPLISTIC AND PROBABLY NOT ACCURATE IN "REAL LIFE" SITUATIONS. USING THE PRPS' LOGIC, THE USE OF FIVE AVERAGE EXPOSURE ASSUMPTIONS WILL RESULT IN A 97TH PERCENTILE ESTIMATE (0.03 PERCENT) INSTEAD OF SOMETHING CLOSER TO AN AVERAGE. THE PRPS FAIL TO ACKNOWLEDGE THAT THEIR APPROACH REQUIRES THAT ALL EXPOSURE ASSUMPTIONS VARY COMPLETELY INDEPENDENTLY. EPA BELIEVES THIS IS UNLIKELY AND THAT A GREAT DEAL OF COVARIATION WILL OCCUR AMONG VARIOUS EXPOSURE FACTORS. THUS, USE OF SEVERAL 95TH PERCENTILE ESTIMATES WILL PROBABLY NOT PRODUCE THE KIND OF OVERLY CONSERVATIVE ESTIMATE SUGGESTED BY THE PRPS.

L.38 COMMENT: THE MODEL WAS VALIDATED USING AVERAGE OR MEAN VALUES FOR INPUT VARIABLES; THEREFORE, IT IS INTENDED TO PREDICT BLOOD-LEAD CONCENTRATIONS FOR THE AVERAGE CHILD AND HAS NOT BEEN VALIDATED USING THE REASONABLE MAXIMUM EXPOSURE APPROACH. (PRP 4)

EPA'S RESPONSE: EPA HAS USED AVERAGE VALUES IN THE IU/BK MODEL FOR SETTING ACTION LEVELS AT THE SITE. EPA IS CONTINUING TO STUDY THE APPLICATION OF THE MODEL IN RISK ASSESSMENT.

L.39 COMMENT: IN REFERENCE TO VEGETABLE CONSUMPTION, EPA NOTES (P. 14, ACTION LEVEL DOCUMENT) THAT "THE RESULTS OF BLOOD-LEAD SAMPLING IN MIDVALE APPARENTLY DO NOT SHOW THE HIGH PERCENTAGES OF CHILDREN WITH BLOOD-LEAD LEVELS ABOVE 12.5 UG/DL PREDICTED FROM DIETARY INTAKE ESTIMATES. THE EXPOSURE DATA FROM THE STUDY DONE IN MIDVALE ARE NOT YET AVAILABLE." IN ADDITION, THE BLOOD-LEAD STUDY (BORNSCHEIN ET AL., 1990) INDICATES THAT CHILDREN FROM HOMES WITH GARDENS HAD BLOOD-LEAD LEVELS 0.4 UG/DL LOWER THAN AVERAGE BLOOD-LEAD LEVELS, NOT 2.5 UG/DL GREATER AS PREDICTED BY EPA. (PRP 1)

EPA'S RESPONSE: THE STATEMENT IN THE ACTION LEVEL DOCUMENT WAS MADE BEFORE ALL RESULTS OF THE BLOOD-LEAD STUDY WERE AVAILABLE. EPA'S RELUCTANCE TO RELY ON THIS STUDY FOR INFORMATION ON EXPOSURE VIA HOMEGROWN VEGETABLES WAS DISCUSSED IN RESPONSES TO PREVIOUS COMMENTS.

M. SOILS CONCERNS

M.1 COMMENT: TAILINGS INGESTION FROM SANDBOXES SHOULD NOT BE INCLUDED AS A RISK SCENARIO BECAUSE PUBLIC INFORMATION EFFORTS HAVE GENERALLY ELIMINATED THIS ROUTE OF EXPOSURE. (PRP 4)

EPA'S RESPONSE: A BASELINE RISK ASSESSMENT IS INTENDED TO ESTABLISH RISKS IN A NO ACTION SCENARIO; I.E., AS IF NOTHING HAD BEEN DONE ON THE SITE. IF THE TAILINGS WERE LEFT IN PLACE, WITH NO ADDITIONAL ACTION BY EPA, THEIR USE IN SANDBOXES COULD BE RE-ESTABLISHED IN THE FUTURE. THE INCLUSION OF A SANDBOX SCENARIO IN THE RISK ASSESSMENT IS THUS APPROPRIATE. THE RISK ASSESSMENT CLEARLY INDICATES THAT THIS IS NOT BELIEVED TO BE A CURRENT EXPOSURE PATHWAY AND INCLUDES EXPOSURE SCENARIOS WHERE THIS SOURCE IS EXCLUDED.

M.2 COMMENT: VEGETABLE CONSUMPTION RATES ARE GROSSLY OVERESTIMATED. MIDVALE CHILDREN WHOSE FAMILIES HAD VEGETABLE GARDENS ACTUALLY HAD SLIGHTLY LOWER BLOOD-LEAD LEVELS THAN CHILDREN IN FAMILIES WITHOUT VEGETABLE GARDENS. (PRP 4)

EPA'S RESPONSE: THE MIDVALE BLOOD-LEAD STUDY PROVIDES ALMOST NO INFORMATION ON GARDEN USAGE. VERY FEW FAMILIES INDICATED THAT THEY GREW VEGETABLE GARDENS, AND NONE OF THE FAMILIES PROVIDED ANY QUANTITATIVE CONSUMPTION DATA. EPA BELIEVES THAT THE SMALL SAMPLE SIZE AND THE LACK OF CONSUMPTION DATA MAKE THE BLOOD-LEAD STUDY USELESS FOR ESTIMATING THE IMPACT OF GARDENING ON BLOOD-LEAD CONCENTRATIONS. THUS, EPA WILL CONTINUE TO RELY ON ITS ESTIMATES DERIVED FROM WORK AT OTHER SITES AND THE ONE GARDEN STUDY DONE IN MIDVALE.

TABLE 1

**SUMMARY OF HEALTH ASSESSMENT RESULTS
(FROM THE BASELINE RISK ASSESSMENT
SECTION OF THE FS)**

1. BLOOD LEAD CONCENTRATIONS (GOAL = 12.5 UG PB/DL)

INTEGRATED UPTAKE/BIOKINETIC MODEL RESULTS:

1. WHEN LEAD IN SOIL EXCEEDS 1000 PPM, 85 PERCENT OF CHILDREN EXCEED BLOOD LEAD TARGET OF 10 UG/ PB/DL.

2. WHEN LEAD IN SOIL IS BETWEEN 500 - 1000 PPM, 36 PERCENT CHILDREN EXCEED BLOOD LEAD TARGET OF 10 UG PB/DL.

2. EXCESS LIFETIME CANCER RISKS DUE TO ARSENIC AND CADMIUM EXPOSURE (GOAL = 1×10^{-4} TO 1×10^{-6}).

| EXPOSURE PATH | EXCESS UPPERBOUND CANCER RISK (ARSENIC EXPOSURE) | EXCESS UPPERBOUND CANCER RISK (CADMIUM EXPOSURE) |
|--------------------|--|--|
| TAILINGS INGESTION | 2×10^{-5} | N/A |
| SOIL INGESTION | 2×10^{-6} | N/A |
| DUST INGESTION | 4×10^{-4} | N/A |
| INHALATION | 1×10^{-5} | 1×10^{-6} |
| PRODUCE INGESTION | 1×10^{-4} | N/A |
| TOTAL | 5×10^{-4} | 1×10^{-6} |

3. HAZARD INDEX FOR ADVERSE NON-CARCINOGENIC EFFECTS DUE TO EXPOSURE TO ARSENIC AND CADMIUM (GOAL IS HI LESS THAN ONE).

| EXPOSURE | HI (ARSENIC) | HI (CADMIUM) |
|--------------------|--------------|--------------|
| TAILINGS INGESTION | 0.1 | 0.02 |
| SOIL INGESTION | 0.003 | 0.0004 |
| DUST INGESTION | 2.0 | 2.0 |
| PRODUCE INGESTION | 0.1 | 0.3 |
| TOTAL | 2.2 | 2.3 |

TABLE 2

LEAD INTAKE IN CHILDREN (UG/DAY)
WITH VARYING CONCENTRATIONS OF
LEAD (PB) IN RESIDENTIAL SOILS

| ROUTE | CURRENT CONDITIONS (PB GT N1000PPM) | CURRENT CONDITIONS (PB= 500 - 1000 PPM) | CONDITIONS AFTER REMEDIATION (WORSTCASE) |
|--|--|---|---|
| SOIL INGESTION | 27 | 10 | 4 |
| INDOOR DUST INGESTION | 199 | 86 | 49 |
| INHALATION | 0.4 | 0.2 | 0.05 |
| PRODUCE INGESTION | 544 | 203 | 29 |
| BACKGROUND DIET | 5.5 | 5.5 | 5.5 |
| TOTAL INTAKE | 776 | 305 | 87.6 |
| PERCENT OF CHILDREN WITH BLOOD LEAD GREATER THAN 12.5 UG/DL (ORIGINAL CALCULATION) | 55 PERCENT | 11 PERCENT | 5 PERCENT |
| PERCENT OF CHILDREN WITH BLOOD LEAD GREATER THAN 10 UG/DL (NEW CALCULATIONS WITH SITE SPECIFIC INFORMATION) | 85 PERCENT | 36 PERCENT | 11 PERCENT |

* VALUES DO NOT INCLUDE PRODUCE INGESTION; RISK REDUCTION WILL BE
GREATER FOR HOME PRODUCED VEGETABLE EATERS.

TABLE 3

**RISKS(*) OF ADDITIONAL CANCERS
DUE TO ARSENIC EXPOSURE**

| PATHWAY | CURRENT CONDITIONS (AREAS WHERE SOIL ARSENIC EXCEEDS 70 PPM AS) | CONDITIONS AFTER REMEDICATION (AS = 20 PPM) |
|--------------------|--|---|
| TAILINGS INGESTION | 2 X (10-5) | 1 X (10-6) |
| SOIL INGESTION | 2 X (10-6) | 1 X (10-7) |
| DUST INGESTION | 4 X (10-4) | 2 X (10-5) |
| INHALATION | 1 X (10-5) | 5 X (10-7) |
| PRODUCE INGESTION | 1 X (10-4) | 5 X (10-6) |
| TOTAL | 5 X (10-4) | 2.6 X (10-5) |
| GOAL | 1 X (10-6) TO 1 X (10-4) | |

* EPA'S CURRENT RANGE FOR ACCEPTABLE CARCINOGENIC RISK IS 1 X (10-4) TO 1 X (10-6).

TABLE 4

**ARSENIC EFFECTS
(ADVERSE NON-CARCINOGENIC)
CHRONIC DAILY INTAKE/REFERENCE DOSE**

| | CURRENT | AFTER REMEDATION(*) |
|--------------------|---------|--------------------------|
| TAILINGS INGESTION | 0.1 | 0.02 |
| SOIL INGESTION | 0.003 | 0.0006 |
| DUST INGESTION | 2.0 | 0.4 |
| PRODUCE INGESTION | 0.1 | 0.02 |
| TOTAL | 2.2 | 0.44 |

GOAL = LESS THAN 1.0

* ASSUMES SOIL REDUCED TO BACKGROUND (20 PPM)

TABLE 6

**SUMMARY OF APPLICABLE OR RELEVANT AND
APPROPRIATE REGULATIONS (ARARS) FOR EACH ALTERNATIVE**

| | 1 | 2 | 3 | 4 | 5 |
|------------------------------------|-----------|---------|---------|---------------|-----------------|
| | NO ACTION | CAPPING | REMOVAL | STABILIZATION | SOIL WASHING |
| GROUND WATER ARARS | X | X | X | X | X |
| DRINKING WATER ARARS | X | X | X | X | X |
| SURFACE WATER ARARS | | | X | | X |
| SOLID AND HAZARDOUS WASTE ARARS | | X | X | X | X |
| MINING RECLAMATION | | X | X | X | X |
| OSHA - ARARS | | X | X | X | X |
| TRANSPORTATION ARARS | | | X | | |
| WILDLIFE ARARS | | X | X | X | X |
| HISTORIC PRESERVATION | | X | X | X | X |
| FLOODPLAINS AND WETLANDS | | | X | | |
| HEALTH EFFECTS TBCS | X | X | X | X | X |

* A FULL LIST OF ARARS AND CITATIONS FOR THE SELECTED REMEDY IS GIVEN IN TABLE 8.

TABLE 8
ARARS FOR THE SELECTED REMEDY

| TITLE | CITATION | APPLICABLE/ RELEVANT AND APPROPRIATE (OU2) | APPLICABLE/ RELEVANT AND APPROPRIATE (OU1 DISPOSAL SITE) |
|---|---|---|--|
| CONTAMINANT SPECIFIC | | | |
| I. SAFE DRINKING WATER ACT | 42 USC S 300G | | |
| A. NATIONAL PRIMARY DRINKING WATER STANDARDS | 40 CFR PART 141 | NO/YES | NO/YES |
| B. NATIONAL SECONDARY DRINKING WATER STANDARDS | 40 CFR PART 143 | NO/YES | NO/YES |
| II. UTAH SAFE DRINKING WATER ACT | 26-12 UCA, R449, UAC | NO/YES | NO/YES |
| III. UTAH GROUND WATER PROTECTION RULES | R448-6 UAC | YES/- | YES/- |
| IV. UTAH WATER POLLUTION CONTROL ACT | 26-11 UCA | | |
| A. UTAH WATER QUALITY STANDARDS | R448-2 UAC | NO/NO | YES/- |
| V. CLEAN AIR ACT | 442 USC SS 7401-7642 | | |
| A. NATIONAL AMBIENT AIR QUALITY STANDARDS | 40 CFR PART 50 | YES/- | YES/- |
| VI. UTAH AIR CONSERVATION ACT | 26-13 UCA | YES/- | YES/- |
| LOCATION SPECIFIC | | | |
| VII. ARCHAEOLOGICAL AND HISTORIC PRESERVATION ACT | 16 USC S 469 40 CFR 6.301(C) | YES/- | YES/- |
| VIII. NATIONAL HISTORIC PRESERVATION ACT | 16 USC S 470, 40 CFR S 6.301B 36 CFR PART 800 | YES/- | YES/- |
| IX. EXECUTIVE ORDER ON FLOODPLAINTS OF WETLANDS | EXEC. ORDER 11908 40 CFR S 6.320(B) | NO/NO | YES/- |
| X. EXECUTIVE ORDER OF PROTECTION OF WETLANDS | EXEC. ORDER 11990 40 CFR S 6.320(A) | NO/NO | YES/- |
| XI. UTAH WATER COURSE STATUTE | 73-3-29 UCA | NO/NO | YES/- |
| ACTION SPECIFIC | | | |
| XII. SOLID WASTE DISPOSAL ACT | 42 USC SS 6901-6987 | | |

| | | | |
|---|--------------------------------------|--------------------------|--------|
| A. TRANSPORTATION OF HAZARDOUS WASTE | 40 CFR PART 263 | NO/YES | NO/YES |
| B. CLOSURE AND POST CLOSURE | 40 CFR PART 264 G (111,114,117) | NO/YES | NO/YES |
| C. WASTE PILES | 40 CFR PART 264L | NO/NO | NO/YES |
| D. LANDFILLS | 40 CFR PART 264N | NO/NO | NO/YES |
| XIII. TOXIC SUBSTANCE CONTROL ACT | 15 USC SS 2621-2629 | | |
| XIV. UTAH SOLID AND HAZARDOUS WASTE ACT | 26-14 UCA | | |
| A. SOLID WASTE RULES | C 450-301 UAC | NO/NO | YES/- |
| B. CLOSURE AND POST CLOSURE | SUBPART 8-7 | NO/YES | NO/YES |
| C. WASTE PILES | SUBPART 8-12 | NO/NO | NO/YES |
| D. LANDFILLS | SUBPART 8-14 | NO/NO | NO/YES |
| E. GROUND WATER PROTECTION | SUBPART 8-6 | NO/YES | NO/YES |
| XV. SURFACE MINING CONTROL AND RECLAMATION | 30 USC SS 1201-1328 30 CFR 816.11 | NO/YES | NO/YES |
| XVI. OCCUPATIONAL HEALTH AND SAFETY ACT | 29 USC SS 651-678 | YES/- | YES/- |
| XVII. UTAH OCCUPATIONAL HEALTH AND SAFETY ACT | 35-9 UCA, PARTS 126, 216, 102 | YES/- | YES/- |
| XVIII. DOT HAZARDOUS MATERIALS TRANSPORTATION ACT | 49 CFR, PARTS 107, 171-177 | YES/- | YES/- |
| XIX. FISH AND WILDLIFE COORDINATION ACT | 16 USC SS 661-666 40 CFR 6.302G | NO/NO | YES/- |
| XX. ENDANGERED SPECIES ACT | 16 USC SS 1531-1543 | NO/NO (YES, IF FOUND) | NO/NO |
| XXI. CLEAN WATER ACT -DREDGE FILL | 40 CFR 230, 231, 323 | NO/NO | YES/- |
| XXII. UTAH WILDLIFE PROTECTION ACT | 23-15-6 UCA | NO/NO | YES/- |
| TBC'S | | | |
| XXII. UTAH WILDLIFE PROTECTION ACT | 23-15-6 UCA | NO/NO | YES/- |
| XXIII. NATIONAL MAXIMUM CONTAMINANT LEVEL GOALS | | NO | YES |
| XXIV. HEALTH EFFECTS OF AS AND CD | ATSDR | YES | YES |